SHIP

ROYAL YACHT FUBBS

MODELING

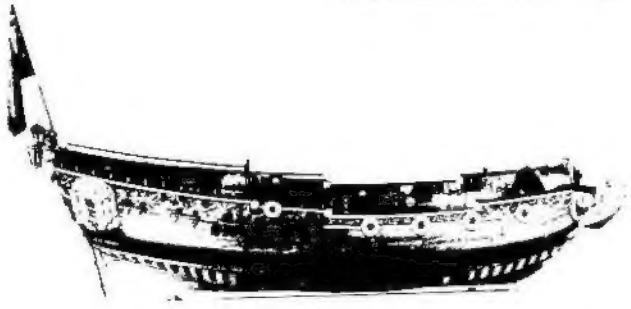
HUDSON RIVER SLOOP VICTORINE

TECHNIQUES

RESEARCH VESSEL VEMA

BY PORTIA TAKAKJIAN

SHIP MODELING TECHNIQUES



ROYAL YACHT FUBBS

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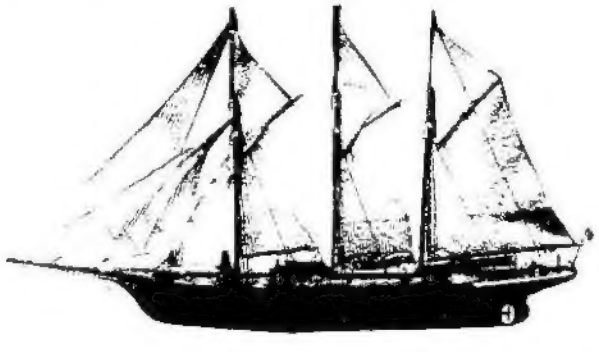

RESEARCH VESSEL VEMA

BY PORTIA TAKAKJIAN

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Forward

Ship model building is a global pastime. However, training in model building is virtually non-existent, leaving most people on their own to develop beyond the basic kit level skills. The range of skills required at the highest levels of ship model building can be significant. The reward for attaining these skills is mainly measured in satisfaction with ones achievements.

One approach, incidentally an excellent one, is through membership in a ship model club. These, unfortunately, are not always available or geographically convenient and may specialize in only one aspect of model building. Another common approach to developing to more advanced levels is achieved largely by studying books and magazines, sorting the wheat from the chaff (when one has learned to do so), then putting the information gained into practice.

Finding someone capable of communicating the information and techniques needed, either first-hand or clearly through the written word, is often difficult. As in many other fields of endeavour, mastery of a subject does not always include the ability to impart that knowledge. Books and true experts often cannot communicate the techniques necessary for the more difficult aspects of model building, which is what an individual working alone needs and is invariably seeking.

Portia Takakjian has spent more than 20 years developing her skills as a ship model builder and has been associated with the Nautical Research Guild, The Connecticut Marine Model Society, The Shipcraft Guild and The USS Constitution Model Shipwright Guild of New England, and museums such as Mystic Seaport. She has models in private, industrial and museum collections. In addition, Portia is one of those rare individuals who has taught formal classes in ship model building.

Portia's many skills include those of a researcher, illustrator, model builder, writer and teacher. One of her most important attributes is the fact that she has not forgotten the needs and frustrations of students struggling along in an unfamiliar world. This combination of skills qualifies her work far beyond the capabilities of most writers in the field.

N. Roger Cole

Introduction

The name of Portia Takakjian is well known in the modeling community. She has the benefit of being not only a modeler, but also a teacher and writer. Her talents are apparent as she presents three distinctly different sailing ship models that represent over 200 years of history. The Royal Yacht FUBBS as re-built in 1774, the Hudson River Sloop VICTORINE of 1849 and the Research Vessel VEMA as she looked in 1953.

This book covers the extensive construction of each of the three models. Photo and illustration numbers are listed concurrently for each model. Chapter numbers are consecutive, though each chapter designates the model ship being discussed.

All three models have appeared in model ship building periodicals. These serialized works have been combined and produced in this book for the convenience of other modelers who will appreciate the wealth of knowledge brought about in this one publication.

Jeffrey A. Phillips
Model Ship Builder Editor

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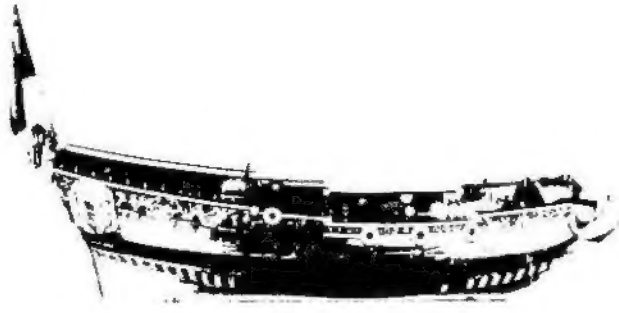


"The Royal Yacht Fubbs"

1

Single Foothook Construction

By the mid-seventeenth century the Baroque period had reached its peak both in England and Europe, and its influence was reflected everywhere. It was an age when the gilder and carver reigned supreme, with the rich and powerful clamoring for their services, not only for the trappings of their households, but as a matter of national pride and vanity, to embellish their ships as well.

The wealth of detail from this period is recorded in the paintings and drawings of Diest, Sailmaker and the two Van de Veldes. Both Van de Veldes, the elder and the younger, were employed by King Charles II to illustrate his ships. Both men were prolific artists and produced thousands of sketches and drawings as well as full size paintings. Perhaps most valuable are the quick sketches, drawn on site of major sea battles, and details of vessels which would otherwise have been lost to us of the 20th century.

Because the baroque style touched every facet of 17th century life, it is not surprising that yachts of that period, more especially during the reign of Charles II, would be as lavishly decorated as the larger ships.

Aside from their duties associated with the workings of the royal household, yachts were becoming increasingly valuable adjuncts to the Royal Navy's fleets. Their speed and maneuverability made them ideal dispatch boats and personnel carriers. They mounted between four and twelve guns and carried crews of from 30 to 40 men.

During the reign of Charles II there were 23 yachts built, five of them in just three years after his return from exile. Of all these built, the most outstanding both in appearance and sailing qualities was the FUBBS, built at Greenwich by Phineas Pett. The word "Fubbs" is defined in an early English dictionary as a half contemptuous name for a chubby child. It was the nickname Charles II gave his mistress, Louise de Keroualle, Duchess of Portsmouth, and for whom the yacht was named.

The mid-17th century was also a period of court intrigue and romance. Royal marriages and the taking of mistresses were largely arranged for political and financial reasons rather than amorous intent. On his return to England, Charles married the Portugese Catherine of Braganza, promising to aid Portugal in their wars with Spain. His sister Henrietta became the Duchess of Orleans and it was through her that he met Louise. Louis XIV had placed Louise in the household of Henrietta as a paid informer. After Charles signed the secret treaty of Dover in 1672 he permitted Louise to leave France and to become a member of court. Louise became the Duchess of Portsmouth in 1673 and remained with Charles until his death in 1685.

The FUBBS had two refits before being broken up in 1781. The first of these occurred in 1701 at Woolwich and here the work was carried out by N. Lee. The second rebuilding was in 1724; this time by R. Stacey at the Deptford yard. It's noted that her carvings were salvaged at this time and it's presumed that these were the originals installed in 1682. The following table shows the changes made

	TONS BURDEN	LENGTH KEEL	LENGTH GUNDECK	BREADTH	DEPTH IN HOLD	GUNS 3 POUNDERS	NUMBER MEN
1682	148	63′	73′6″	21′0″	9′6″	12	30
1701	157	61′	—	22′0″	9′8″	12	40
1724	152	61′5¼″	76′9″	21′6″	9′0″	8	40

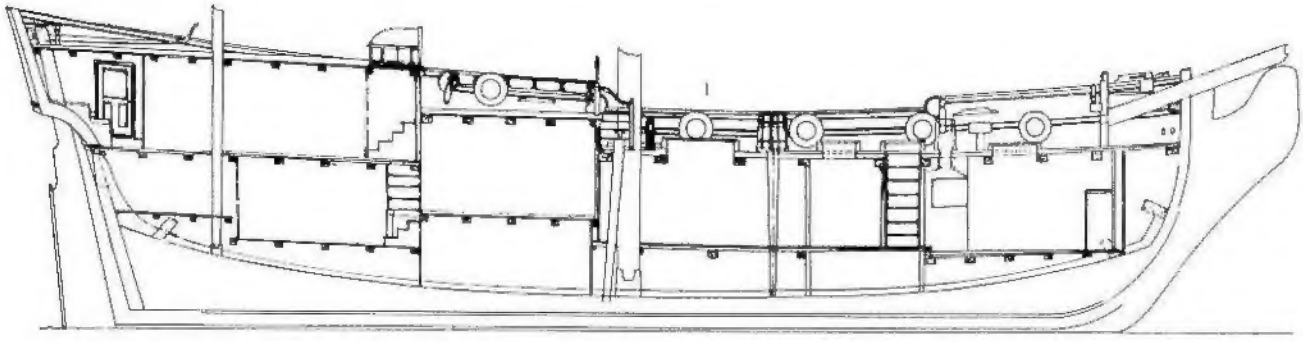


Figure 1.

but does not include the raising of her deck "as much as could be done" in 1749.

Some of these measurements require explanation especially when viewing the inboard profile of the FUBBS. Prior to 1677 the tonnage rule was calculated on the formula using the length of the keel as the standard of measurement (length of keel × breadth × 1/2 breadth ÷ 94). After that date, the formula was altered to compensate for the lengthening of keels, which was said to increase the strength and stability of ships without changing its overall length between perpendiculars. This meant that the true length of the keel would no longer be used for measurement. Instead, the length of the gundeck minus 3/5ths the beam would be the measurement of the keel for tonnage. The formula now read: length of the gundeck − 3/5ths beam × beam × 1/2 beam − 94. You'll note the tonnage of FUBBS when first built reflects the old formula.

The length of the gundeck was increased in 1724 by 3'3". As seen in the inboard profile of the FUBBS (Figure 1), the actual gundeck stops at the quarterdeck bulkhead abaft the main mast. The measurement is taken from the wing transom at the stern forward along an imaginary line to the fore side of the quarterdeck bulkhead and then forward to the bows. The depth of the hold is measured from the underside of the deck beams in the waist to the upper side of the floors.

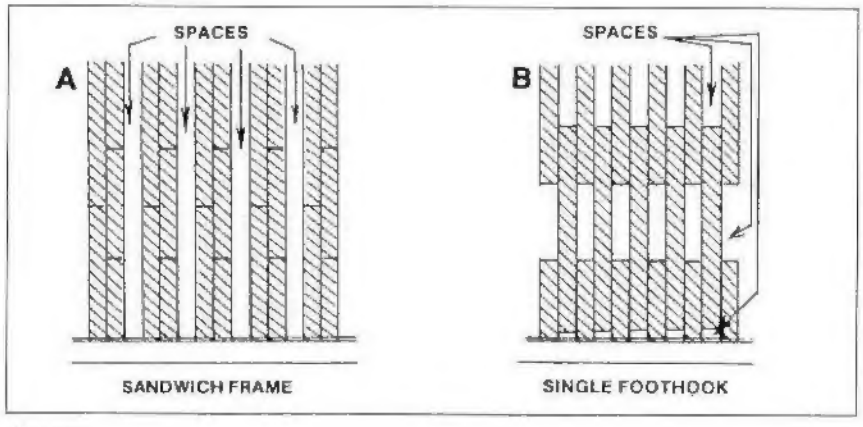


Figure 2.

It appears as though the establishment of 1701 which abolished carved gilded work on men of war, had little or no effect on FUBBS as rebuilt in 1724. Originally, the carvings on the FUBBS cost the crown over 300 pounds. Reason enough for saving them. However, the answer may be in the fact that these rebuildings were more often than not presented as refits, thereby making the expenditure of funds more palatable. Anything that could be salvaged from the former vessel was, and so the majority of the beautiful carvings were retained.

The number of men carried aboard FUBBS in 1724 reflects the involvement with naval affairs as opposed to strictly pleasure use of the yacht. It was normal for yachts of this size to carry a crew of 30 men except in time of war or when on naval business. Officers of rank were housed under the quarterdeck and the remainder of the crew forward of the main mast below the gundeck. The galley forward had a large open hearth whose chimney vented through a movable wooden stack, lined with clay on the gundeck. Most of the beams were relatively light. The poop deck was not

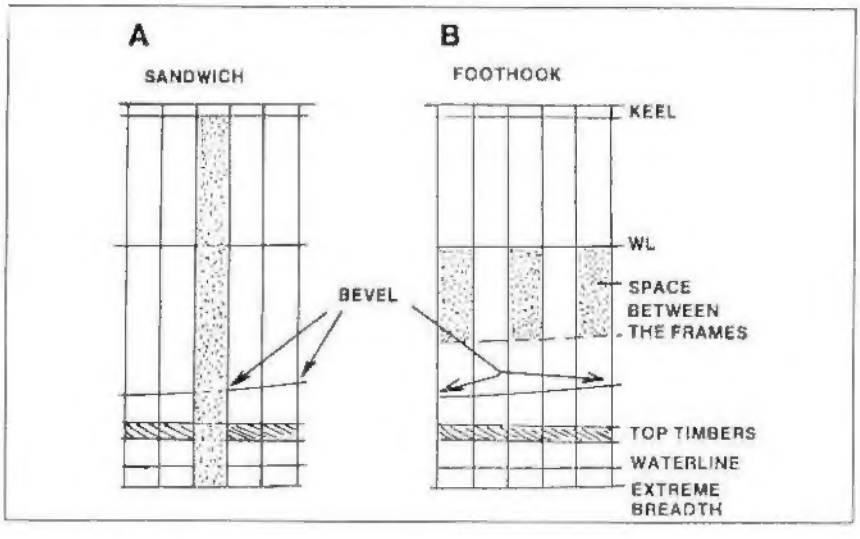


Figure 3.

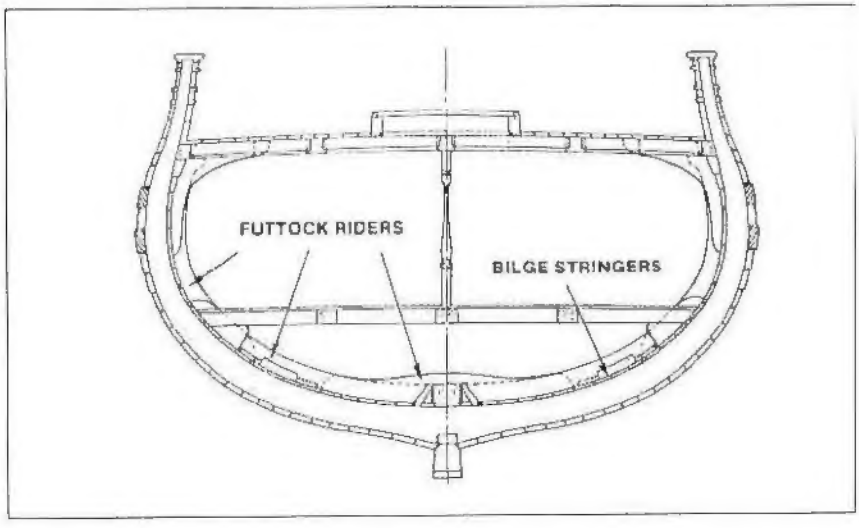


Figure 4. Frame 14.

meant to carry any weight. The king's quarters were called the round house or poop royal.

The lack of space below decks not only effected the lives of those on board, but had a direct bearing on the type of ballast carried aboard these small vessels. Depending on their size, these yachts would carry between 10 and 14 tons of ballast. Had this been the usual type of ballast — sandstone and shingle — it would have filled half the space below the gundeck. Some sort of ballast that would require less space was essential, and while the Navy commissioners were not happy over the cost, it was agreed that lead and old iron shot was the best solution.

The challenge to the model builder is in recreating the carvings and mouldings of this baroque period in scale. The National Maritime Museum at Greenwich has over a dozen drafts of yachts but few are as complete as those for the FUBBS.

In addition to the plans, there are photographs of the model believed to be the FUBBS at the time of her 1724 rebuilding. These consist of two broadsides, one from the bow and the other from the stern quarter, and a stern shot showing the carvings.

The plans give the lines, all the deck floor plans, and the designs of both the quarterdeck and poop bulkheads. There are also numerous paintings and drawings of the yacht done during various periods in her lifetime, so that if one wished to paint the model it could be done with accuracy. There are also written accounts of her fittings and rig. She is believed to be the first Ketch rigged yacht, because up until 1677 there were no ketches on the naval lists. A note in the Naval Minutes (pages 116, 220, and 366) of Samuel Pepys dated January 1677 reads, "The King pleases himself mightily with a design he is now going upon building, a yacht the size of the KATHERINE that shall go with a Ketch's sail."

In keeping with the period of the original model, I planned to build this model on the single foothook system, and hoped to devise a method of construction that would appeal to other modelers who might like to try building a similar model or one on this same system. At the same time, I knew there would be people out there who would like to build this model, but who would want to use the usual double or sandwich type frame that most modelers are familiar with. These frames are constructed in two layers, glued together. This type of construction leaves the frames independent of each other but with each one secured to the keel (Figure 2-A).

In single foothook construction individual frame sections alternate with the floor and top timbers throughout the length of the hull (Figure 2-B). They are all interdependent and only the floor sections are secured to the keel.

The spaces between the floor timbers and the top timbers form an openwork pattern from bow to stern. Unlike the sandwich type framing, all the frames are set square to the keel with the occasional exception of the very last frame aft. There are no cant frames at the bows and the only one at the stern would have been the fashion timber, but this would depend on the type of stern the vessel carried. The FUBBS had a square stern. At the bow, a solid chock of wood replaces the cant timbers. At the stern, another chock of wood fills in below the lower horizontal transom timbers. The bevels on the frame sections flow in an uninterrupted curve in contrast to the sandwich frame where the bevels must be assumed in the spaces between the frames. This is more easily seen in the half breadth plan where the waterlines cross the outer faces of the frames (Figures 3-A and 3-B).

Although there is no evidence that the FUBBS was built on this single foothook system, there is a hint that the framing was light. A note from Sir Phineas Pett, the original builder, states that FUBBS would carry futtuck riders. These were long knee-like timbers placed on top of the ceiling planks next to the frames for strength.

There is an interesting definition for these riders in *A Treatise on Shipbuilding and A Treatise on Rigging* Written About 1620-1625, edited by W. Salisbury and R. C. Anderson in 1958 for the Society of Nautical Research. A portion of the definition reads, "...and sometimes there are futtuck riders used which launch up to the orlop to strengthen a weak built ship. These long compass timbers crossed the keel and were bolted to the floors. They served to hold the ends of the scarfed timbers of the frames in position against the natural tendency to curl inward in the shrinking and warping process as the wood dried out". (Figure 4)

The framing diagram for a model of

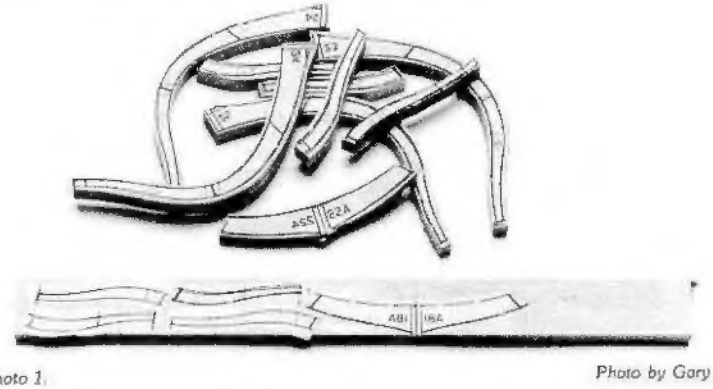


Photo 1. *Photo by Gary Lillien.*

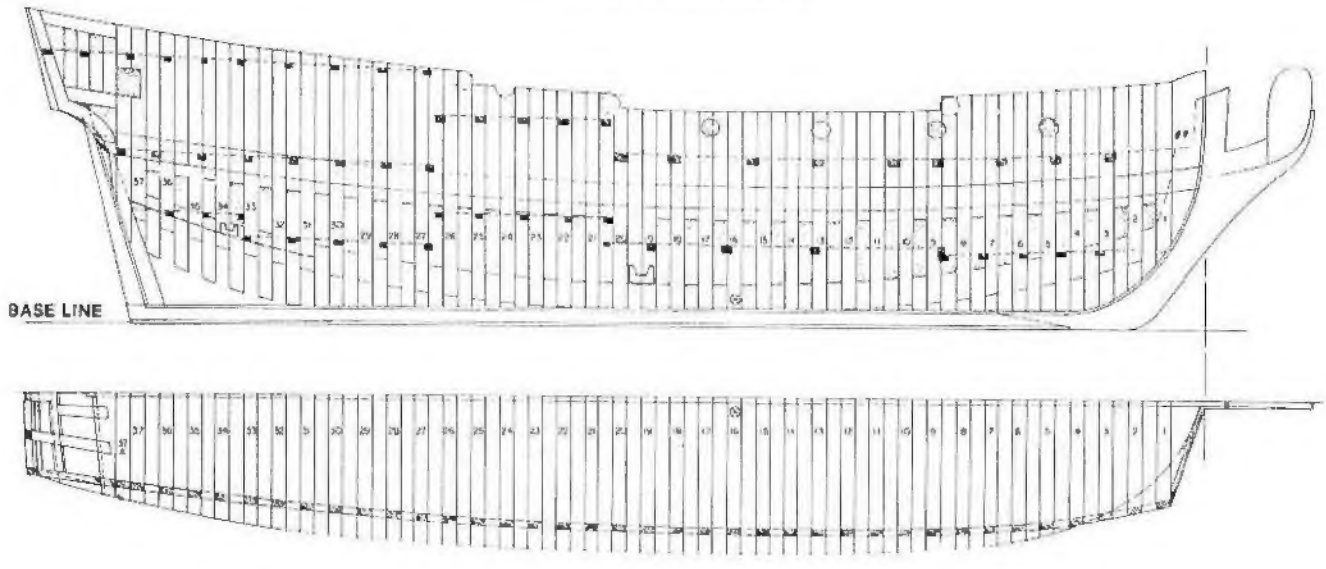


Figure 5. Framing diagram.

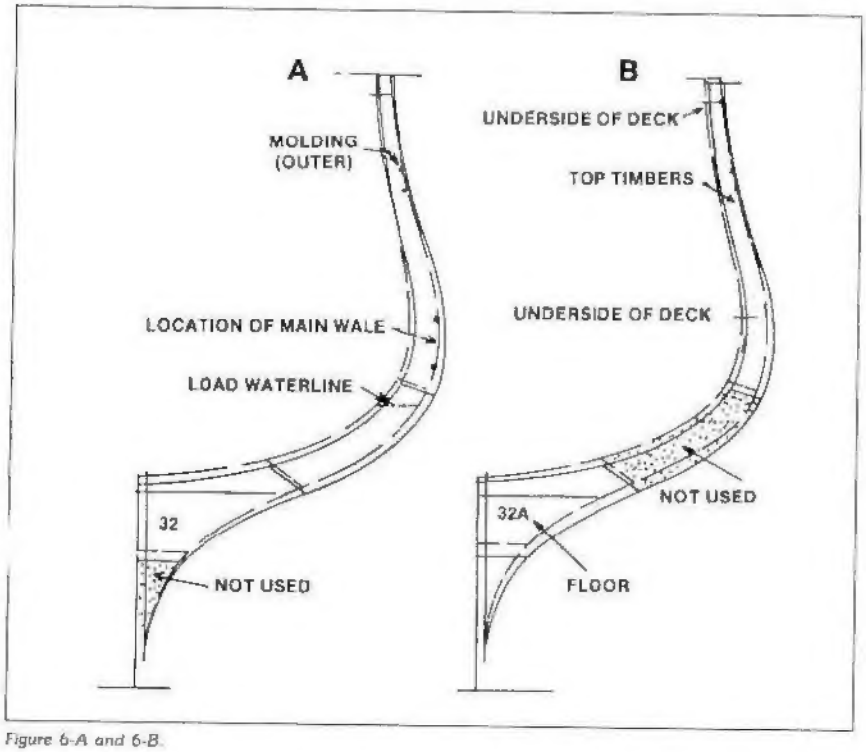


Figure 6-A and 6-B.

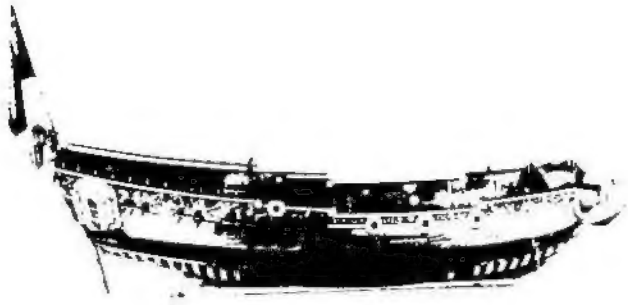
this type has to include the shape of the openwork caused by the space between the floor and the top timber (Figure 5). Traditionally, the bottom of the top timber comes just below the lower edge of the main wale. Plotting this area is relatively simple. The floor timbers require a little more experimentation. Due to the underbody shape of the hull this line does not run in a smooth curve from bow to stern when viewed from underside of the keel. It has a more serpentine shape, even though when viewed from the side the curve sweeps upward from mid-ships in a smooth arc. Another space is created at the stern where the floor timbers begin to rise on the deadwood. There are variations on the treatment of the bow timbers. In some examples they, too, have a gap while others bring both the floor timbers and the intermediate frames down to the rabbet line.

The only other item on this plan that is needed is the location of all the decks. These could then be plotted to the individual frame units so that they could be marked in on the inboard side of the cut out frame. Providing sirmarks was of extreme importance because of the nature of this building method. Wale locations outboard and the location of the port openings would come as a mater of course in controlling the position of each frame in relation to the one next to it. A typical frame section is in Figure 6-A. Since the bevels carry from one frame to the next, a second unit has to be drawn showing the floors and the top timbers (Figure 5-B).

The wood chosen for the framing of the model was maple, because of its reliability and resistance to chipping and checking. Surprisingly little wood is required for the hull. I found I only needed three boards 36" long, 1/4" thick and 7" wide. The stock I obtained was planed on both sides but I still had to surface sand the strips for the frames down to the exact thickness. Because the frame sections are small, I found they could be cut from 1" and 1½" strips. The curved framed sections took up only 1¾ boards with some to spare (Photo 1).

In preparing the plans for this vessel I had drawn up each frame section, on separate sheets of tracing paper, which included the base line, centerline, waterlines, extreme breadth line, location of the wales, and the top timber lines. Next, one-half of each frame was drawn on a master sheet which I then ran through a copy machine on vellum. The size of the copies can now be controlled without distortion, so I felt confident in having made one right side copy and one in reverse. This gave me a completed frame with the centerline and base line as a guide.

Each frame is numbered to include the floor and top timber section and the whole frame next to it; for example, 1 and 1A, beginning at the bows. This avoids confusion during assembly and when cutting the paper patterns for each unit. After the sections are rubber cemented to the stock, cut out, and shaped, they can be checked against the original tracing for accuracy.



2

The Shaping Procedures

In 1932 paymaster Commander C. M. Gavin produced a book on the royal yachts that became the classic reference on this subject. Since that time no other work has equalled the scope of his *Royal Yachts*. Although considerably more material has come to light, this publication is still considered the best for general information and illustrative material on the royal yacht throughout history.

One surprising aspect of this volume is the doubt about which of the models held at Greenwich represents the FUBBS. More recently the National Maritime Museum at Greenwich definitely identifies FUBBS in their catalog and one wonders why this could not have been done sooner. The model shown in Gavin's book opposite page 256 is quite different from the plans provided by Greenwich, but it is described as a late 17th century ketch rigged yacht — probably the FUBBS. Another model, opposite page 270, then owned by Mrs. Drago Monagu, was also thought to be a possible representation of FUBBS, though this would seem doubtful because it was not ketch-rigged and the number of gun ports was considerably more. Normally the Stuart yachts carried the royal arms as a decoration of the stern however, in the case of the Greenwich model, these are absent. In their place are two cherubs on either side of the seated draped figure. The circumstances surrounding the original conception and purpose for the building of the yacht might have been an indication of why the royal arms were omitted.

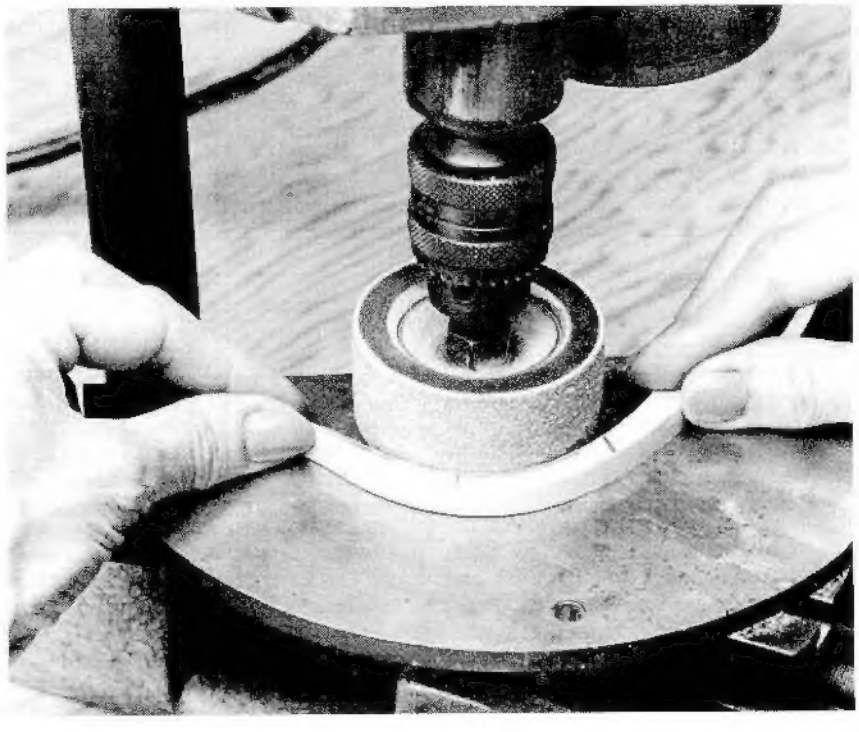


Photo 2. Sanding the bevel on the inside curve. The frame is tipped slightly toward the rotating drum while sanding proceeds. Once the drum reaches the inside curve, the bevel will be complete.

Photo by Gary Lilien.

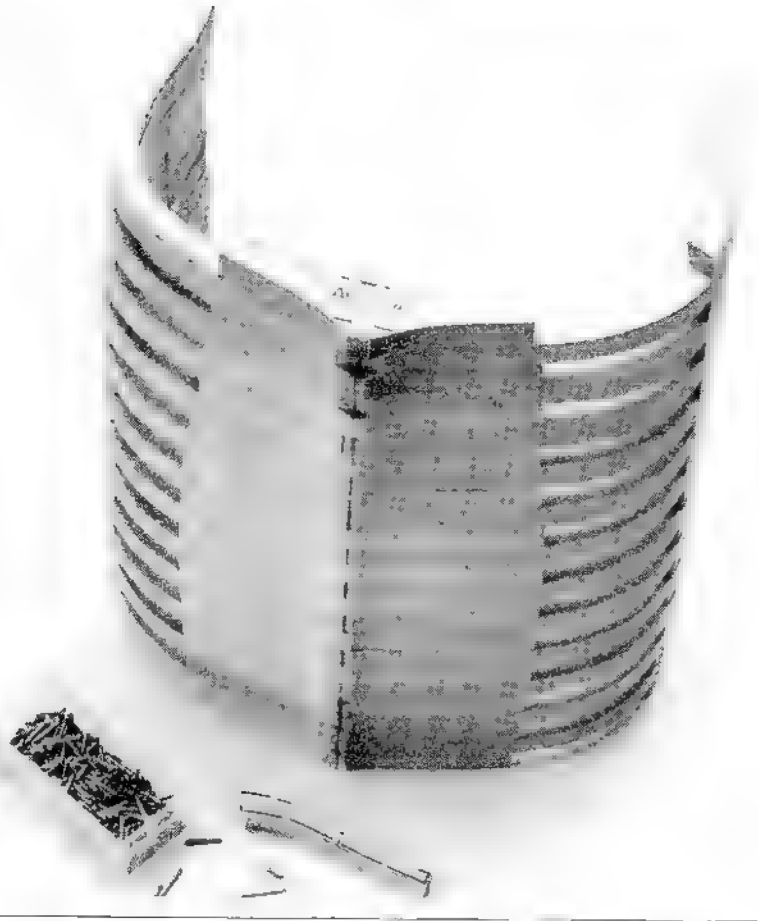


Photo 3 Frames, stacked and glued. See the serpentine shape taken by the floor timbers. At the lower left is a box of treenails and top timber. Note also the floor timber at the top of the stack. The paper pattern shows the heel of the whole frame location just below the number "9A". Before removing the pattern, tick marks are made on the side of the floor now in position as a location key for the next whole frame.

Photo by Gary Lillien

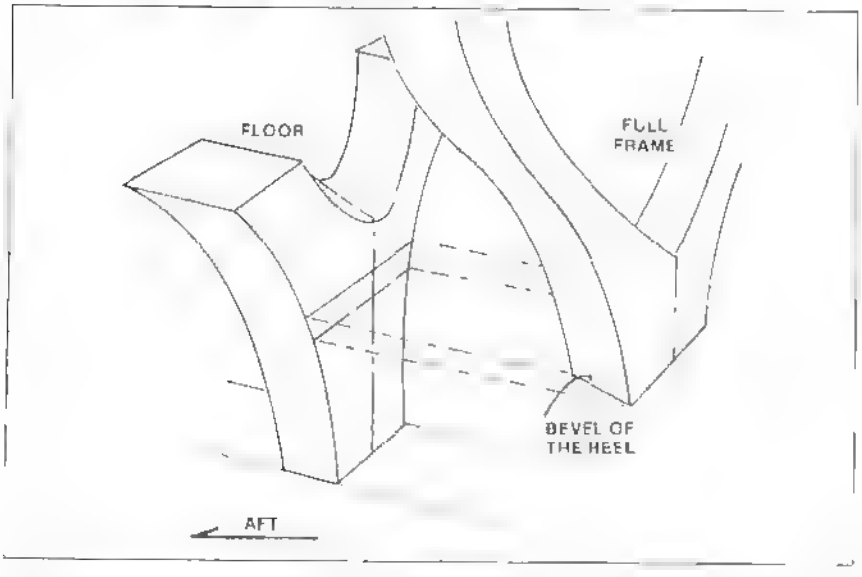


Figure 7

Some while back there was an article in the *Mariners Mirror* describing the Honeymoon voyage of 1764 taken by Princess Augusta, sister of King George III, and the Prince of Brunswick. This same voyage was described by Gavin but his tale was totally different. Commander May's version is supported by the ship's logs and therefore is more believable. The young couple was enroute to Holland and what is most remarkable is that from the onset the two set out in separate carriages to board separate yachts all the way to their destination. The Princess in the FUBBS and the Prince in the yacht AUGUSTA. This vessel, like any other, needs the cross referencing. Still, the paintings and drawings in Gavin's work, along with the admiralty references, are valid.

The completed model is a little over two feet long. The plans supplied from Greenwich were not at the usual 1, 1" to the foot scale, but 3/8" to the foot. Regardless of this, my model is built at 1/4" to the foot scale. Earlier I mentioned the small amount of wood required to build this model but I would like to expand a little on the means for obtaining the proper thicknesses even if you purchase your wood "to scale". Recently a fellow model builder has made available to the public a thickness sander that solves the problem of getting lumber to size, not only for the frame sections but for the other lumbering needs that will occur throughout the building process. For those of you

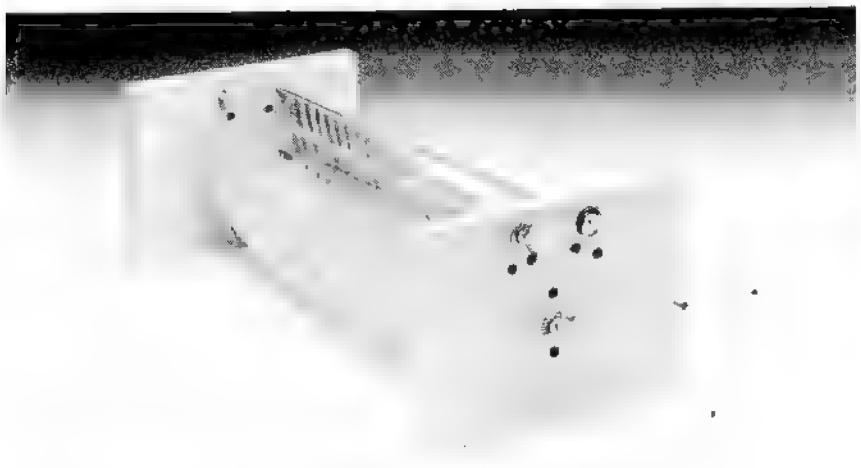


Photo 4. A clamping device for the hull. Alternate holes are used during various phases of the building process. Photo by Gary Lillien

planning to use a natural wood interpretation of the model, the ability to dimension your own lumber is a must. The cost of one of these machines is worth the price if you consider the expense of custom milling.

In almost every description of single bulkhead construction the narrator invariably talks of the difficulties involved in assembly. Certainly this is understandable if the normal framing conventions are observed, whereby the keel is laid and the frame sections are assembled on it, one unit at a time. This, no doubt, has been a deterrent for the majority of model builders who might otherwise give this method a try.

Clearly a keying system would have to be devised as well as a clamping system if I planned to deviate from the norm. The motivation for this effort was the opportunity to show other model builders how this could be done with satisfactory results. It was also important to find a method that could be used by the modeler who had limited access to tools. Providing adequate sirmarks inboard and outboard on the plans was half the battle, leaving only the clamping method to solve. However, before getting into this aspect of the construction some definite points need to be covered about the frame components themselves.

Fortunately for us, there is now material available in specific thicknesses from hobby suppliers or woodworking suppliers. I stress the use of hardwoods because they take a good deal of punishment without breaking. However, softer woods such as basswood, can be used. What is important is the manner in which the pieces are laid out on the wood for maximum strength. The greatest amount of bevel occurs at the floors and the turn of the bilge.

Because there are no gaps between the individual frame sections the amount of bevel between the units is relatively small. The most fragile portions of the frame sections are the outer ends of the floors and the top timbers. Because these alternate between the whole frame sections, they are placed with the grain. The whole frame sections are placed on the wood stock so that their floor sections are also placed with the floor portion running with the grain, leaving the top timber portion almost diagonal in most cases. The fragility of this portion of these frames is overcome by the fact that they are sandwiched between two top timbers with the grain running straight.

Whether the frame units are cut on a band saw or power jig saw, the units are cut to the outside of the line as was seen in the previous chapter. The final profiling was done with a disk sander mounted on the Unimat® (Photo 2). Sears & Roebuck sells a particularly good 2¼" drum sander with a 1/4" shank that can be mounted as mine was in a drill press setup or in an electric drill mounted on your workbench. I also used a 1" drum sander mounted in the drill for sanding the inside curves of the frames located at the bow and stern.

Sanding to the outboard lines of each frame section must be done at right angles to the face and then each unit should be checked against the tracing of the frame outline before beveling and assembly. The sirmarks inboard and outboard are put on after each unit has been beveled. Keeping the bevels a little heavy is a good idea. The units can be faired into the next following one after they have been glued in position. All the frame patterns are rubber cemented to the wood stock and unlike the sandwich construction, these patterns are only removed at the last moment before the next unit is applied.

The floor portions and the gaps that occur at the ends of the vessel are the most subtle areas to watch. Depending on how you have cut out and sanded your sections, you might find it necessary to trim the ends of the top timbers and the ends of the floors. It's easily done by pinning a batten along the edge you want to create, marking in pencil and then trimming with a #11 X-Acto® blade. The floor section shows where the whole frame section is located. At mid-ships this comes to the bottom of the floors but as you work towards the ends the whole frame section rises (Figure 7). It's important to indicate on the side of the floor timber just where the bottom of the whole frame section is located.

In constructing this model I worked from mid ships towards the stern first since I felt this would be the most difficult portion to solve for the reader. As previously mentioned, the shape of the floor timbers

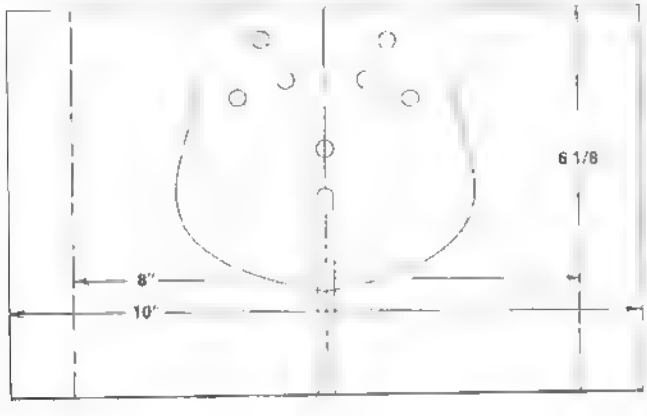


Figure 8

took on a serpentine shape when viewed from the bottom. This is shown in Photo 3. A number of frames have been assembled as you can see, which brings us to the clamping procedure. I don't know if it was historically correct to carry the whole frame top timbers right to the top or not. I do know that it provides a firm base for the planking there and, without some kind of chock between the top timbers, clamping would become an impossible task.

What is needed is consistant pressure over the completed unit. The answer is a vice-like grip overall. This was accomplished by the use of two scraps of 3/4" plywood and three 24" long 1/4" diameter threaded rods (Photo 4). The plywood was bored to receive the rods in several different setups so that as the ends of the hull narrowed the rods could be raised and brought in closer to the centerline. The plywood boards are parallel to each other but one is wider than the other to prevent tipping over. One end of each rod has the threads bunged over and a nut forced down over the threads to keep them from moving. Then a washer is put on to allow the rod to rotate freely in its assigned hole.

At the other end is a wing nut which makes tightening and releasing the hull fast and efficient. Figure 8 shows the layout of the holes on the plywood. Setup time with Titebond® glue is about five minutes. This allows you time for repositioning if necessary after about one minute for tack time. You'll find you can work several frame units a night depending on the speed with which you work. It's safe to remove the hull from the jig after an hour's time for doweling. These dowels are now available commercially but mine were the traditional bamboo treenails. These were pulled through a drill plate down to a #57 drill size.

As you approach frame #30A, the last floor frame before the deadwood aft, you'll have to think about cutting the deadwood, inner sternpost, sternpost, and wing transom. These components are all a part of the longitudinal sections of the hull. The deadwood has the location of the floor timbers marked on it with what is called the cutting down line. This is the demarkation line of the ends of the floors. Below this point the deadwood is cut away down toward the keel (Figure 9).

There are two ways to approach installing the floor timbers. The first is to notch the deadwood at the cutting down line and then to match the lower end of the floor to it. The other is to partially notch out the deadwood and the floor timber so that the floor timber rides over the deadwood. This second method was the one choosen for my model. In either case, the deadwood has to be notched. It's particularly critical because the remaining tabs can easily be broken. The joining has to be a comfortable push fit yet snug enough to hold without binding since the deadwood must be removed after each mating to cut the notch required for the next floor timber. Between fittings the full frames are glued in position, then put in the jig, followed by doweling and removal of the paper pattern. No attempt is made at this time to shape the lower ends of the floor timbers. After all of them have been installed as far as #36A, the deadwood can be glued in place. Both #37 and #37A are full frames. The opening for the quarter gallery would not be cut until after the wing transom had been fitted and installed. Both these timbers touch on the inner sternpost so this must be installed now.

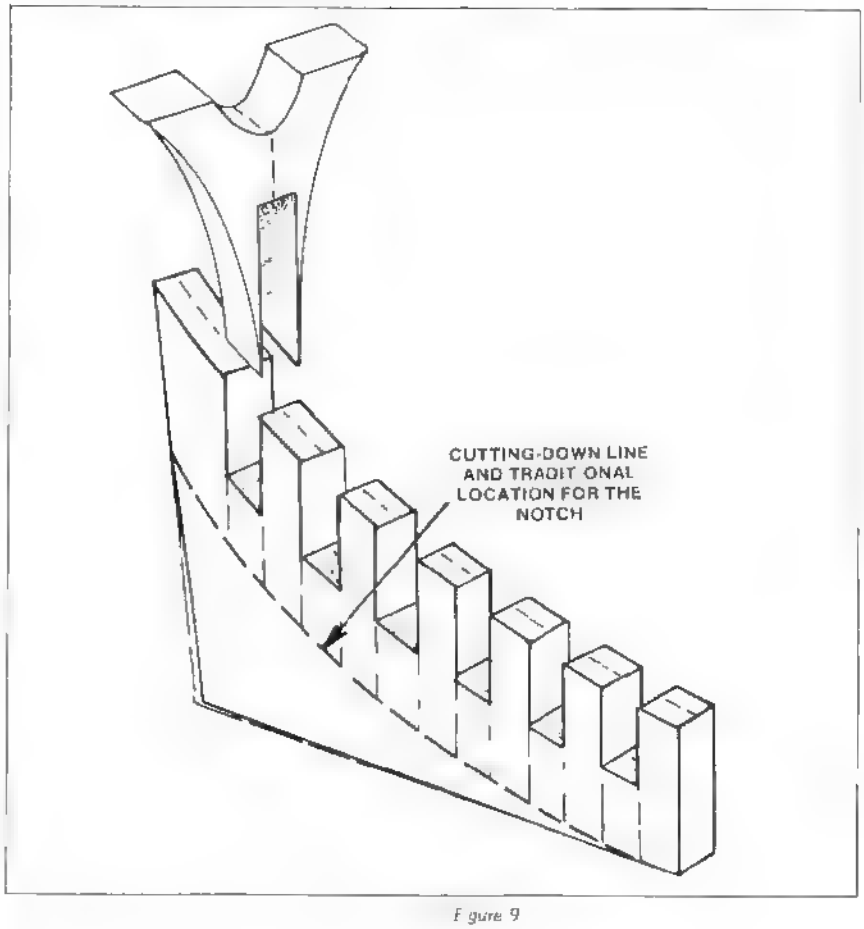


Figure 9

WING TRANSOM

The shape of the wing transom is indicated in the framing plan shown in the previous chapter. For ease of construction, its forward edge is set at right angles to the last frame (#37A). This complex shape is more easily understood if one begins with a rectangular shape the length indicated on the half breadth framing plan, 3/8" square. Both the fore side and bottom of the wing transom follow the angle of the after edge of the inner sternpost with the lower portion rabbeted for the stern planking. The outer ends curve following the shape of the last frame.

All this sounds rather complicated, but it isn't if tracings are made for each of the faces and worked on in turn. Beginning with a length of 3/8" square stock with a centerline drawn in down its middle, a tracing of the top view is rubber cemented to the top face, lining up the tracing with the centerline and fore edge of the block (Figure 10-A). After sanding the V-shaped angle, the block is beveled to match the inner sternpost. The dashed line indicated on the tracing represents the lower after edge.

The after face is now shaped. A tracing which gives the upper curve of the wing transom is rubber cemented to it, lining up the centerline and the lower edge (Figure 10-E). Next comes the curve for the fore edge and, although the tracing procedure is the same as before, the sanding must be done freehand working from front to back (Figure 10-C).

All that now remains is to curve the ends. To do this, the wing transom is positioned on top of the inner post lined up with the centerline. The ends are bored for treenails which are driven in dry (without glue) to hold the wing transom in position for shaping to the curve of the last frame.

The cleanest and most simple way of forming the rabbet at the stern is to do the following. Two scraps of 1/16" thick sheet stock is curved to match the upper edge of the transom edge (Figure 10-D). The lower edge of the rabbets curve is marked across the back of the wing transom in

in pencil. The scraps are glued in position, leaving a gap the width of the inner sternpost between them at the top. The excess material is sanded off flush to follow the curve of the top of the transom. In the diagram, the ends are shown to give you an idea of how the shape progresses

Before this piece is permanently glued in position, the lower ends of the last frame is sanded flush with the inner post. This will be the landing for the lower ends of the stern planks. In Photo 5 the tracing is still on the back of the frames and you'll note where the pattern tracing has been sanded away

Photo 5. The pencil indicates the area where the paper pattern has been sanded away, leaving a flat surface flush with the after side of the inner post. The lower portion of the wedge fiver piece will occupy this space when the assembly is complete

Photo by Gary Lillien

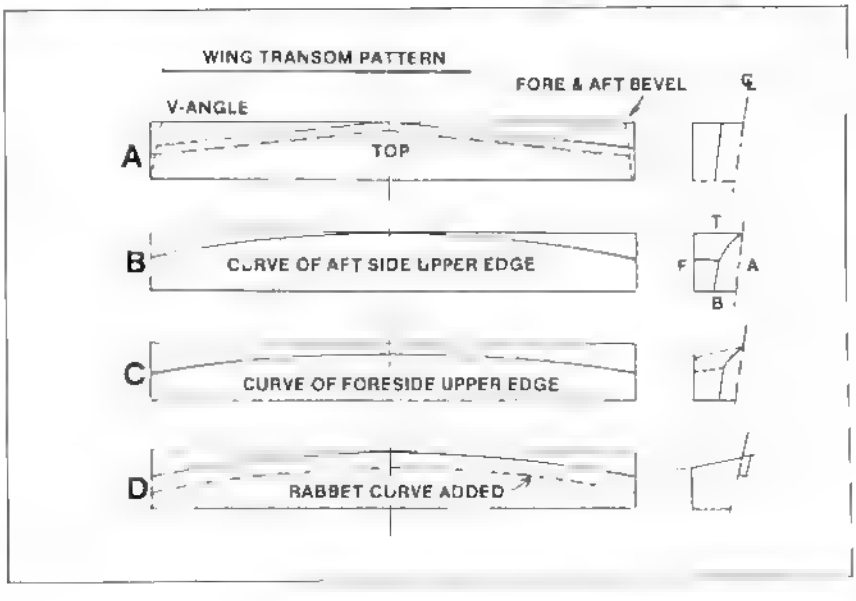


Figure 10-A,B,C, & D

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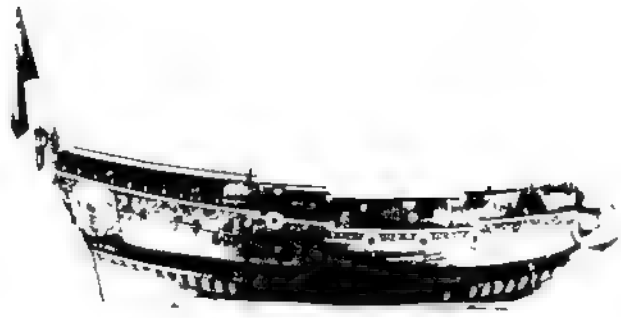


Building The Transom

Now that the wing transom is completed, you will prepare to build the transom. This is the most fragile area of the ship and the most troublesome to construct — even in full size practice.

The stern knees, which rest on the top of the wing transom, carry on their delicate heels the full weight of the transom and its carvings. The stern elevation (Figure 11) shows the various components of the transom and their relationship to each other. The dashed line surrounding the top of the transom represents the area that will later be covered with carvings. The curved counter is planked horizontally and will be painted with a decorative frieze. Below this, the square stern is planked diagonally.

The four stern windows are bordered top and bottom with a moulding running athwartship. Another moulding separates

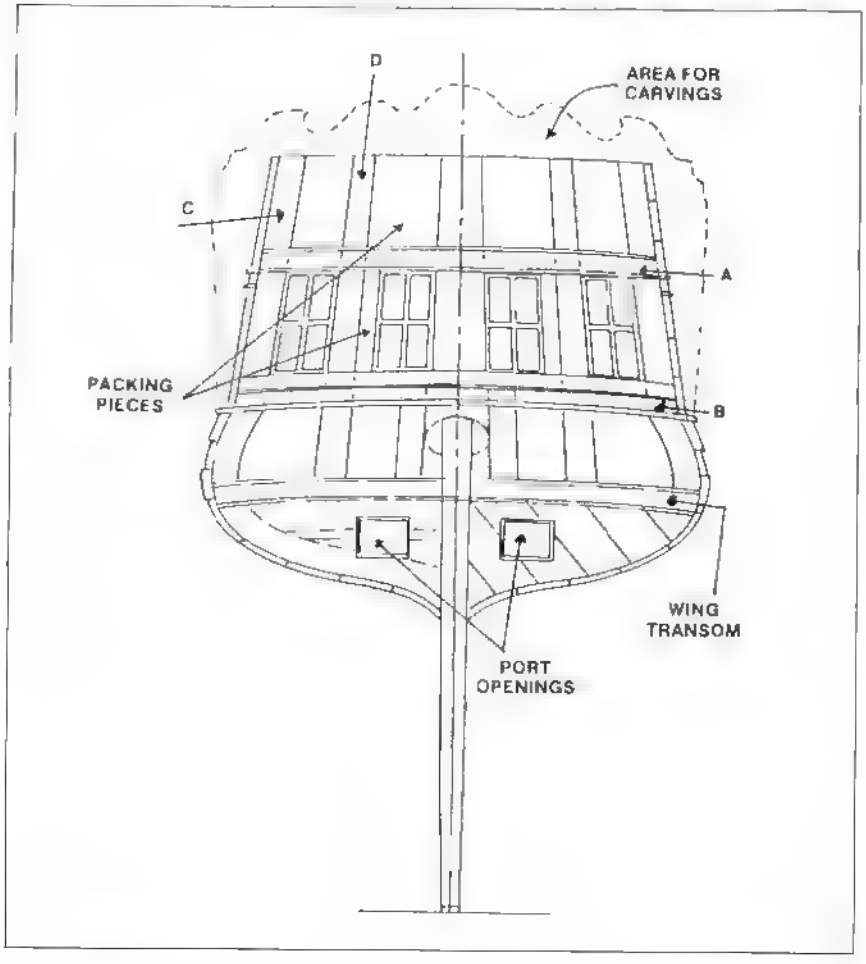


Figure 11

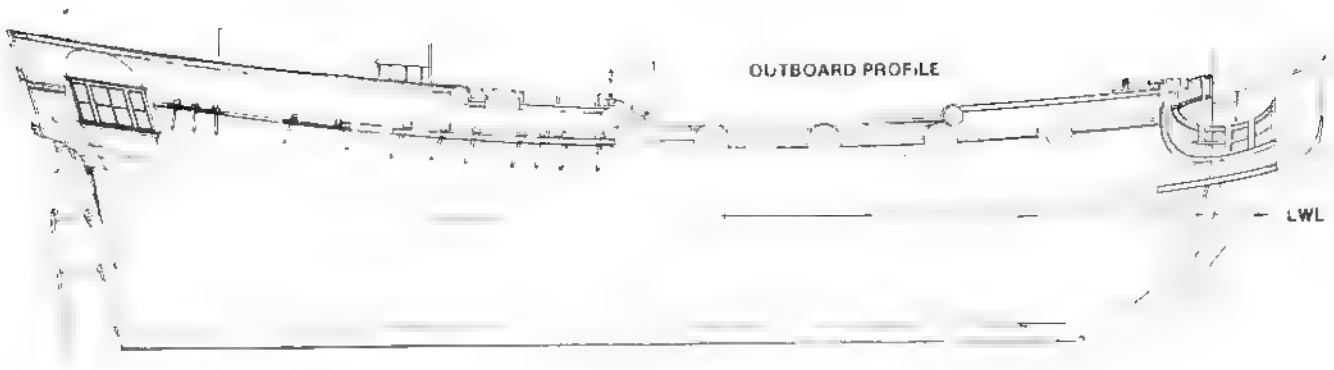


Figure 12 The outboard profile

the counter from the square stern Just below the rudderport on the stern are two port openings. These cut through a portion of the frame as seen in the stern elevation

The outboard profile diagram (Figure 12) shows the shape of the stem knees It also indicates the thickness of the planking across the back of the transom

tracings for reference marks All the straight cuts are done first, then the curved portion for the counter. No attempt is made at this time to bevel any of the edges This will come later after most of the excess stock has been removed from the outboard side Rather than sand this off, a large portion can be cut away with

marked on the inboard side of the side pieces

New tracings are made for the inner stem knees, the center support and the half knees located on each side of the port opening for the rudder These can be cut from 1/4" thick stock and time will be saved by using one side of the stock

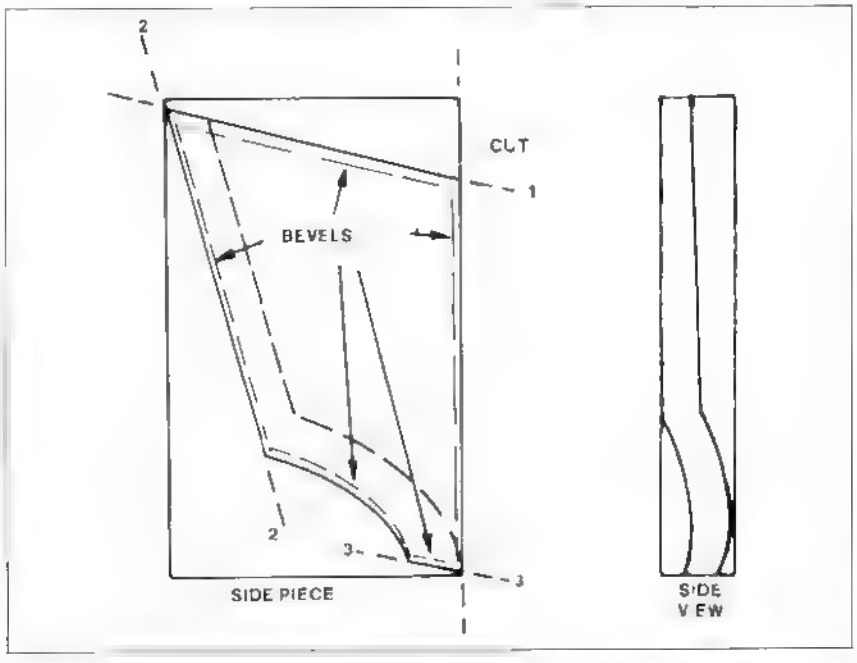


Figure 13

and the slight curve above the counter The transom can be built up with framing, or a combination of framing and packing pieces which was the way I did it on the model. This method will provide a solid foundation for the carvings at the stern and the quarter galleries

To begin, the side pieces are cut from 3/8" thick stock. Tracings are made for each side (Figure 13). The side view shows why the sections must be cut from a thick piece of wood The outboard shape follows the shape of the hull. When installed, the side piece will lie flush against the last frame with its lower edge seated on top of the wing transom

The location for the opening at the quarter gallery should be indicated on the

some careful sawing using a jeweler's saw Match the fore edge of the piece with the shape of the last frame. In order to do this, you will have to first bevel the heel, then the side which meets the frame Once the bevels are correct, the shape of the last frame can be penciled onto the foredge of the side piece. As seen in Figure 11, the outboard pieces (C) taper towards their upper ends. They do so to match the thickness athwartship of the last frame's top timber

Once the outboard side has been shaped, the bevel on the curved section for the counter can be filed in followed by the after edge of the side pieces Both the underside of the deck and the opening for the quarter gallery can now be

for the side of the knee You will only have to taper one side to have it match the outline in Figure 11-D

The inboard side of these knees should also be tapered towards the upper ends to about 3/32" fore and aft. Lower down they can be reduced to just over 1/8" Before these can be properly fitted you will have to cut and fit the upper and lower cross pieces above and below the window openings. However you can proceed to cut the half knee and the center support — again from 1/4" stock

Patterns should be made for the cross pieces in similar fashion as the tracing for the wing transom Each has a slight curve The upper one follows the deck camber of the poop and serves as a deck beam to

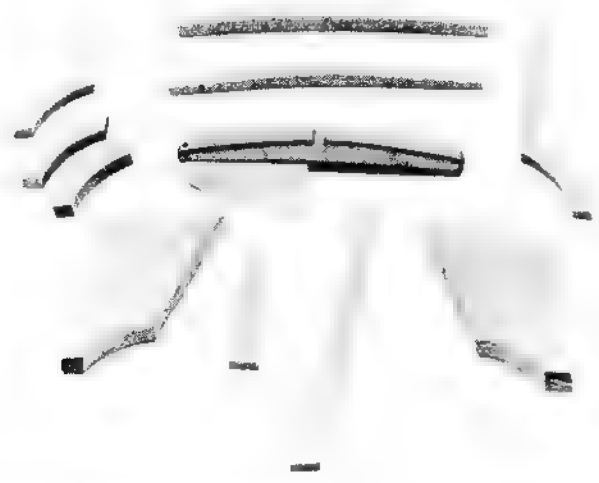


Photo 6 The stern transom components; beginning at the top and moving left to right: stern knee, upper and lower cross piece, stern knee, wing transom filler wedge, center support, sternpost and side pieces The beveling is complete and the next step is to notch the various units prior to assembly

Photo by Gary Lillien

receive the ends of the deck planking. For this reason, the upper cross piece is cut from a strip about 3/8" wide The athwartship curve is not as great as the lower cross piece

The outboard profile plan indicates this because you can see more of the back of the transom lower down than you do at the location of the upper one. Tracings for these cross pieces are taken from the stem elevation. At this time the stern knees are also marked on their after faces, because these cross pieces are let into them slightly Where the two intersect there is a slight angle. The single notch on the center support is not as much of a problem The depth of the cut on the stern knees will depend on how thick (fore and aft) you have made them. About half the depth is sufficient to take hold of the cross pieces

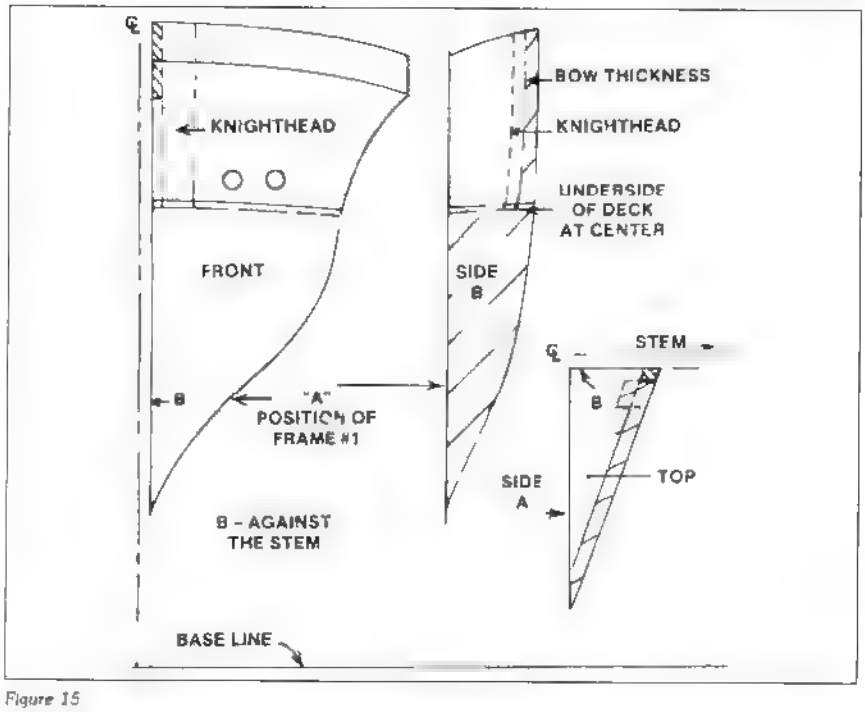


Figure 15

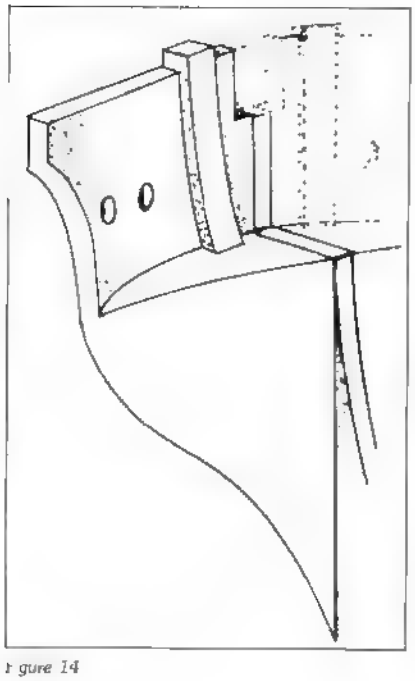


Figure 14

Before gluing and pinning these parts, try all of them on the wing transom. Temporary pins can be inserted to keep them in position while this is done. A short deck beam clamp can be fastened permanently to the side pieces and pinned to the inboard sides of the hull for support in that area

The stern components are shown in Photo 6. You'll note that the fore edge of the cross pieces have been cut straight This makes marking the notches much easier. If packing pieces are added to the side pieces after getting the cross pieces fitted, it will help to make the whole structure more rigid

Once the stern knees are fitted, the half knees and center support can be installed. The rudder port will need beveling to allow clearance for the sternpost and rudder, but this should wait until the whole unit has been fitted to the wing transom. It won't be installed now because there is additional work that should be done first The stern carvings, windows and mouldings are all gold leafed, including the inboard faces of the window frames and mullions This is a particularly messy job at best and to try to do it after the glass is installed would only make for a poorly covered window frame

If you do not plan to gold leaf the windows and surrounding carvings, you can proceed with the building and install the glass later. However, I prefer to handle this delicate job while the transom is still unattached to the hull. Gold leaf is very expensive today, but there are substitutes in the form of metal leaf. How well they hold up and resist tarnish I don't know.

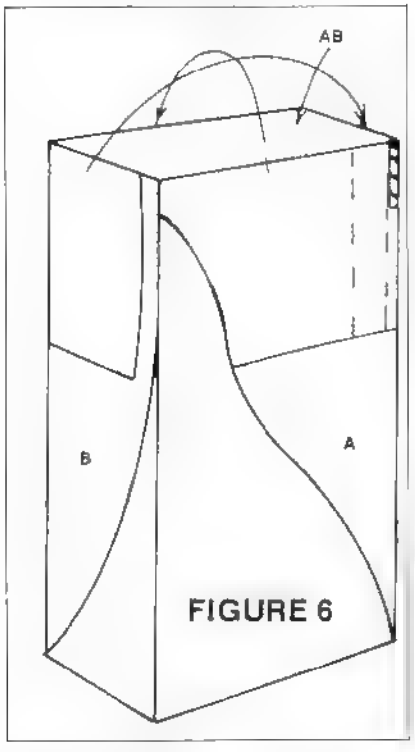


FIGURE 6

Figure 16

However, some alternatives should be explored if you don't have a friendly neighborhood framer who would be willing to sell a few leaves of the real thing. The window frames are made from 1/32" stock wide enough to accommodate the munnions and the glass, plus a little extra so that the front or outboard edge can be sanded flush with the face of the transom.

The munnions are cut from 1/32" by 3/32" stock. Once the frames are cut, glued in place, and sanded flush with the transom, work can begin on fitting the glass.

A good source for glass are plastic slide mounts for color film. Some are extremely thin and the glass is thinner than most microscope slide glass. It's very fragile but worth using. (However, if you have to grind down the edges for a perfect fit or a disk sander, be aware of the hazard and wear protective goggles.)

The glass can be scored easily with a #11 X Acto knife, and the excess glass snapped away by placing the glass on top of a straight edge with the score lined up with the edge. The wanted portion is held in position firmly while you press down with your other thumb on the unwanted portion. It should snap away cleanly, but if not, it can be ground down on the disk sander. After cleaning the glass with a good liquid detergent it can be set aside until you have glued the inside of the frames and cut the uprights inboard to hold the small panes in place.

Thin strips should be glued to the inboard side of the stern knees and middle support between the cross pieces. It's been my experience with this thin glass that it does not take kindly to glue. Perhaps it's more porous, but, for whatever reason, it takes on a clouded look if an epoxy or instant glue is used to secure it. The wood surrounding the glass will shrink in time so depending on glue to permanently fix the glass is not a very good idea. It's far better to give the glass a place of its own and to close it in, as in the case with uprights that slightly overlap the stern knees thus holding the glass without stress on either component.

Outboard on the face of the transom two mouldings border the top and bottom edge of the windows. The top moulding serves as a seat for the carving that will eventually cover the upper portion of the

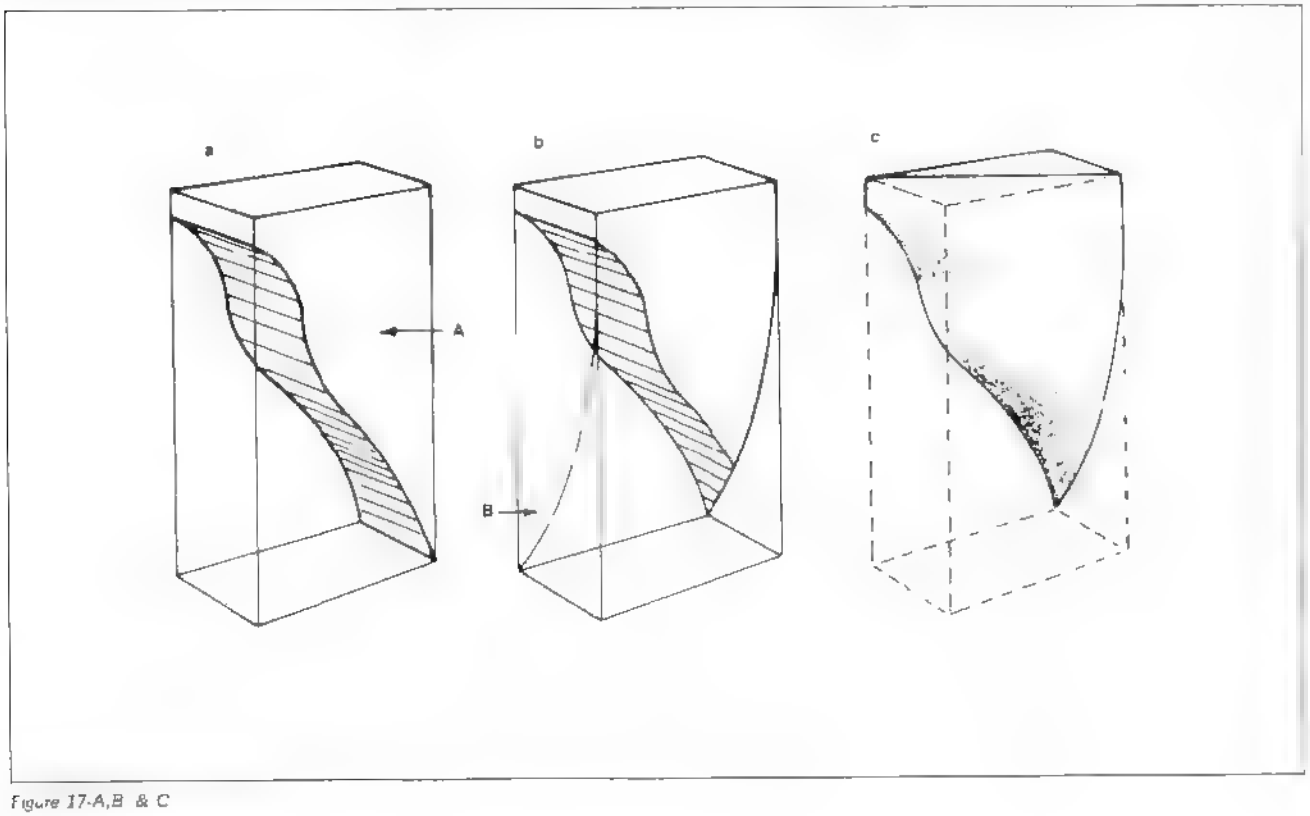


Figure 17-A,B & C

transom. The lower moulding will act as a margin plank for the counter. Both are cut from 1/8" x 3/32" strip wood, and curved to match the curve of the cross pieces. Setting the curve can be done using a small soldering iron held in a vise. The ends of the mouldings are cut flush with the sides of the transom where they will meet the side carvings. The edges of the mouldings should be slightly rounded to be in harmony with the softness of the carvings. This completes the understructure of the transom which will be set aside while we turn our attention to completing the framing at the bows.

FINISHING THE BOW SECTION

There are two ways in which the bow framing differs from that of the stem. First, the floors reach all the way down to the rabbet line and, second, there is no deadwood. Only the apron is extended inboard at the location of the wedge high up at the bows. Reference to the framing diagram will show where the frames begin to rise up the curve of the stem at floor #3A. Because it is necessary to continue clamping the frames right up to the wedge portion, a template for the curve of the floor heels has to be made from a scrap of cardboard if shaping the heels is done prior to fitting the stem piece. Even then, it's a good idea to file the curve a little heavy until the stem is put on to assure a really good fit.

The whole frames begin to take the flair outboard at frame #4. The top timbers begin to square off almost immediately at frame #3 as the flair increases up to the last frame forward. From frame #1 to the stem there are no more frames. Instead, a wedge fills the gap. Outboard it follows the shape of the hull and inboard, from above the underside of the deck, the excess stock is removed (Figure 14) up to the top of the timberheads.

This wedge has a difficult shape which required three tracings for each side of the hull (Figure 15). The wedge is cut from a rectangular piece of wood the height, width, and depth of the drawings. The block should be squared off on all sides and then marked on the sides "A" and "B" alternately with cutting out the shape of the wedge (Figure 16). The first cut is the front section, so the height of the deck is first traced off onto the back side, lining up the center line with the edge of the block. The tracing is then lifted off and rubber cemented to the front side and cut out. The side tracing can then be traced and cut. Figure 17 shows the progressive shape of the wedge as the cuts proceed. "A" shows the cut outline of the front tracing; "B", after the second cut of the side tracing; and "C", the final cut of the top and shaping of the wedge.

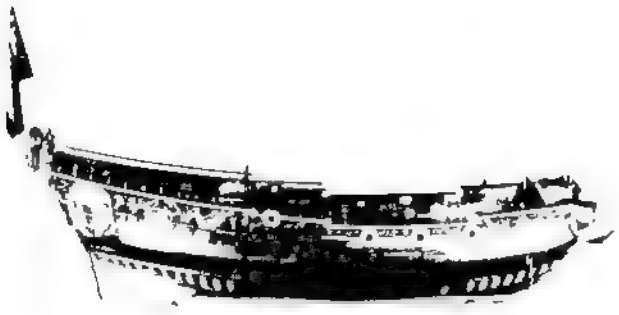
It's a good idea to cut the hawse holes with the first cut, while the block is still totally flat on the back side. The outboard edge of the first cut should match the shape of the fore edge of frame #1. Any variation can be checked before the cut is made by holding the block in position on the hull and tracing off the shape frame #1 and comparing the two outboard lines.

The third cut (TOP) can be done with a band or scroll saw, as before, or sanded, but with either method it is important to hold the piece at right angles to the base line. To do this, a thick squared off block is tack glued to the back of "A" with its bottom edge flush with the bottom of the wedge. This block will give you the freedom of movement you need during the rough shaping, too. It will have to be removed for removing the material inboard, so it should be tack glued lightly. The wedge can then be fed into the saw or up against a disk sander without loosing a finger. This block will also give you something to hold onto while rough shaping the fore side of the wedge.

Final shaping will be done when the wedge is installed on the hull but some of the material can be removed at this stage. Before shaping the inboard side, a decision has to be made about how to treat the knightheads on each side of the stem. They are needed for support of the bowsprit athwartship and they can be applied later or carved into the wedge. Their upper ends are capped over with a semi-circular piece which has a raised moulding cut into it, but this is applied later as a separate unit.

If the knightheads are put in as a separate unit, it will make carving the inboard side a lot easier and this is how it was done on the model. The two reference lines on the back of the wedge indicate the underside of the deck as was mentioned before. This eliminates the need for a breast hook and deck beams forward. The ends of the deck planks will be supported by the ledge created by carving this area. The side elevation in Figure 15 shows the deck at the center line while the front elevation gives the round up of the deck athwartship. Rapid stock removal can be achieved with the use of a Dreme® or Foredom® hand drill and a straight end mill cutter. As you move closer into the bows, care must be taken that you don't run through the front portion. A rheostat control is nearly a must unless you have exceptional control over the handling of the Dreme®. Its RPM is nearly too fast for the job even with the regulated model.

The notch for the bowsprit opening indicated by the hatching in Figure 15 can be cut at this time, but remember that its lower edge follows the slope, or downward slope of the bowsprit. If you were building FUBBS as she was originally constructed this portion of the bow would have appeared outboard forward of the bulkhead that would have been located at frame #1. This is how the model of FUBBS appears in the catalog from the National Maritime Museum. The model obviously represents FUBBS as built. On the foreside of the bulkhead there are gilded carved figures. In the rebuilding of 1724, these figures have been replaced by the simplified moulding trim as indicated in the outboard profile plan (Figure 12).



4

Keel And Stem

Before beginning on the keel and stem, some work must be finished on the deadwood aft and the heels of the stern frames (Photo 7). The keel diminishes in width, as it moves toward the sternpost to about 3/16". Here, it will meet the tapered lower end of the sternpost. This taper of the keel is reflected in the floor timbers and, finally, the thickness of the deadwood at the juncture between its lower face and the keel's upper face.

Excess wood is removed from the lower portion of the deadwood to make room for the lower planks on the hull. The tapering of the deadwood begins at the ends of the heels of the frames. The taper increases as it approaches the lower edge which seats on the keel.

The line created at the ends of the heels by the taper is called the cutting-down line and you'll find it occurs automatically as you begin filing off the excess wood. In Photo 7-A you see the rough untrimmed edges of the frames that have been cut a little heavy to allow for shaping. 7-B shows the trimmed frames and the cutting-down line. The lower edge on the innerstem post will be slightly chamfered to form part of the rabbet of the stem post for the ends of the planks. The underside of the deadwood should have the center line and width of the lower edge marked on it so that it can be checked as work progresses with removing the excess stock.

The temporary pins holding the wing transom can be replaced now with permanent ones. Once the wing transom is glued in position, the stern post is cut and fitted, and the hole for the rudderpost on the transom is cut. The longitudinal members are shown in Figure 18.

The stem post tapers from 1/4" at its upper end to 5/32" where it seats on the keel. Its fore edge has a slight chamfer, its back edge has to be beveled to allow the rudder to turn 45 degrees. Once this is pinned and glued to the inner post, the opening for the rudderpost in the transom can be cut into the packing piece between the half knees on the counter. The oval opening nearly touches the upper edge of the counter.

Although the rudder hasn't yet been constructed, a shaped stick representing its upper end can be used to check for room

Photo 7-A and 7-B. These photos show the before and after views of the deadwood timbers. 7-A (left) shows the heels of the timbers before trimming. 7-B shows the same area after they have been faired into the deadwood along the cutting down line.

Photos by Gary Lillien

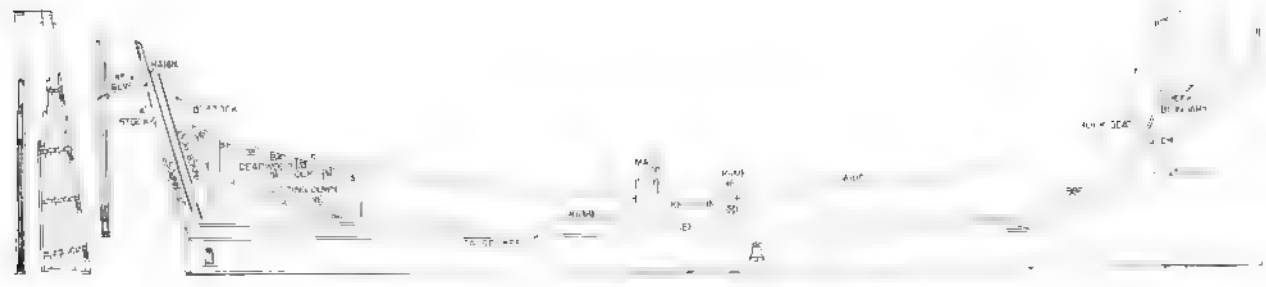


Figure 18 Longitudinal members

and shape of the port opening. This should be finalized now because of the work remaining to be done on the transom.

The space below the counter on each side of the sternpost can now be filled in with two wedges (Figure 19) that will serve as a landing for the stern planking. Traditionally, this area has been filled in whether or not the hull is fully planked. It's not too difficult to understand when you consider the amount of decoration that centers around the transom. Leaving it unplanked would draw attention away from the decorative transom and focus it on what essentially is a gaping hole. The wedge lies flush against the last frame with its after face angled away from the inner post out to the edge of the last frame.

A small port lies close to the sternpost and you'll find that when cut through, this port will cut into the lower edge of the wing transom. These ports are meant only for ventilation and are not left open on the completed model, so the choice of whether to cut them through is left up to the individual modeler. Whatever the decision, the opening should be marked on the wedge so that the diagonal planking can be worked in around it.

The port can be cut from a single slab and fitted with hinges and a ring (Figure 20), then just glued into the gap left by the planking. The wedge is cut from 1/4" stock and sanded to shape. The after face continues in the same plane as the lower portion of the frame. The lower edge feathers out to nothing in order for it to meet this plane and its inner edge, that lies against the stem post, had the rabbet cut into it for the planking. Once this is glued into position, you can turn your attention to the keel and stem.

Provisions should be made for transferring the model from the clamping device to a building board once the keel is installed on the hull. I use a piece of 3/4" ply slightly longer than the finished hull supported by two cross braces 2" x 2" square. The upper surface is painted white and down the center of the board is a 1" square strip with a centerline drawn down its length. Half the width of the keel is set off on each side of the centerline so that two short chocks can be glued at each end to support the keel. Padded angle irons clamped to the board support the hull.

Both the keel and stem taper along their length. In addition to the taper of the keel fore and aft, it also broadens at the false keel to become almost bell shaped (Figure 22) at mid-ships. The concave shape gradually diminishes towards the bow and stern becoming nearly vertical. The stem is tapered on its fore edge from the forefoot to the seat for the figurehead.

Part of the shaping can be done prior to scarfing the stem to the keel, leaving the final shaping of the stem until after the two have been joined. A tracing should be made for the stem piece including the line which indicates the position of the upper cheek. This line must be transferred to both sides of the stem as a reference point (Photo 8). There is no apron included in the stem piece, only the extension section that will secure the two bow chocks. The rabbet line in this area should be cut with a fine V-chisel and below that the rabbet is filled. The keel goes on first, after fitting the false keel. If you like, the pilot holes for the mounting bolts can be drilled before fixing the keel to the hull, then enlarged afterwards.

Securing the keel is a tricky operation. To prepare, holes are bored in every third floor timber for treenails and the deadwood area of the keel has #72 holes bored for brass pins. This cuts down on the drilling time which will be important when the epoxy glue is applied to the heels of the frames and the underside of the deadwood. Five minute epoxy is used and although that seems like a lot of time — it isn't. Everything has to be in readiness including the 1/2" long treenails (#52 drill size).

Assembly begins at the deadwood with the brass pins that are inserted, hammered in, nipped off, and filed flush. This will keep the keel in position so that when it's flipped over drilling can begin into the keel for the treenails. Each of these should have a touch of glue before insertion, then hammer them home. Wait until all treenails are in before trimming them off. I used a small disk sander in a drill to clear off the tops.

The stem is a little more difficult to fit but if the heels of the frames are well trimmed it should slide into position without problems. It helps to have bored pilot holes for the treenails that will secure the scarf; just a touch with the drill will pin the stem quite securely. Be sure

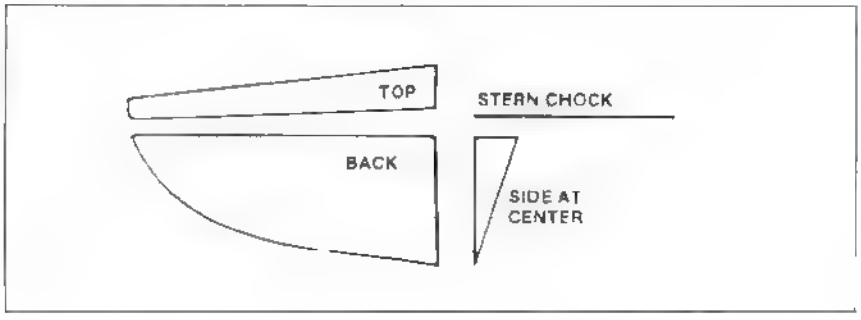


Figure 19

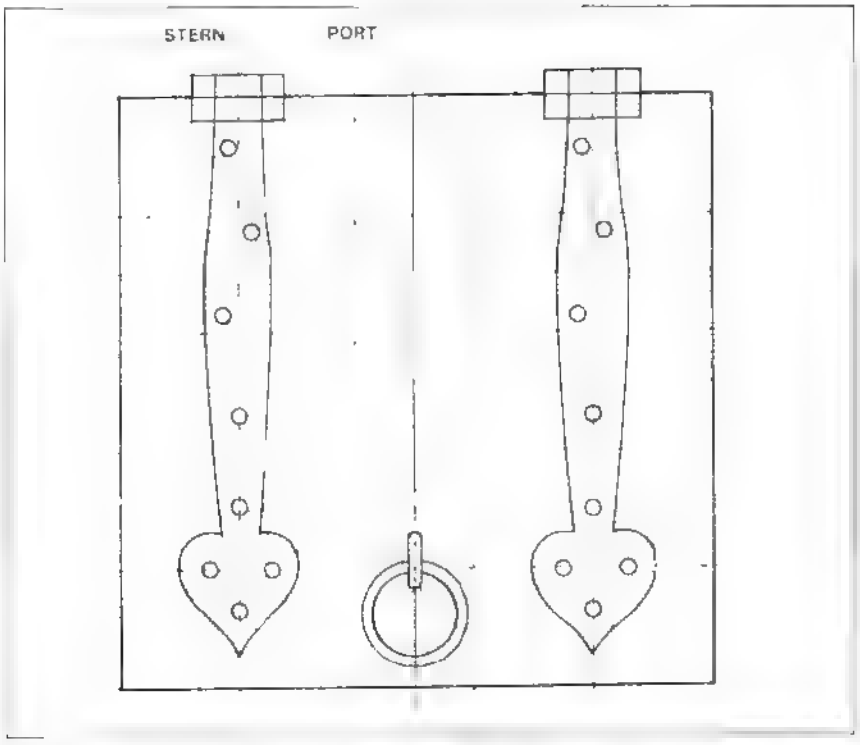


Figure 20

to remove any excess glue because all of it will show if you don't (Photo 9)

After the keel and stem are in, the keelson can be installed It's shape is shown on the longitudinal parts diagram This piece is glued and pinned in position over the floor timbers followed by enlarging the holding bolt holes Final shaping must be done on the foreside of the stem. Work the piece in to the fore part of the keel until the two merge Follow up with a final sanding to remove any file marks This will complete the work on the hull below the waterline

INSTALLING DECK CLAMPS

Before all the deck clamps are put in position a decision has to be made regarding the outboard planking Any inboard timber that is installed below the main wale inboard will look untidy if the hull is not totally planked over If the choice is to plank the hull, then construction can go on below the eve of the great cabin and main deck

The Greenwich model is planked over and the decks have been partially planked

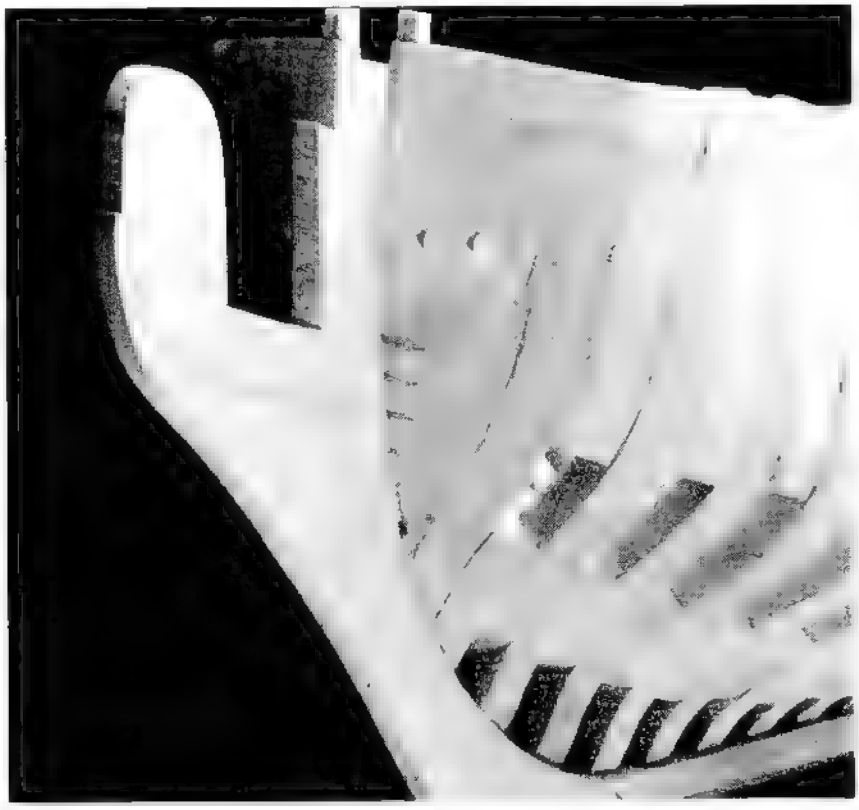


Photo 8 The line which indicates the position of the upper cheek is clearly visible on the stem piece
Photo by Gary Lilien

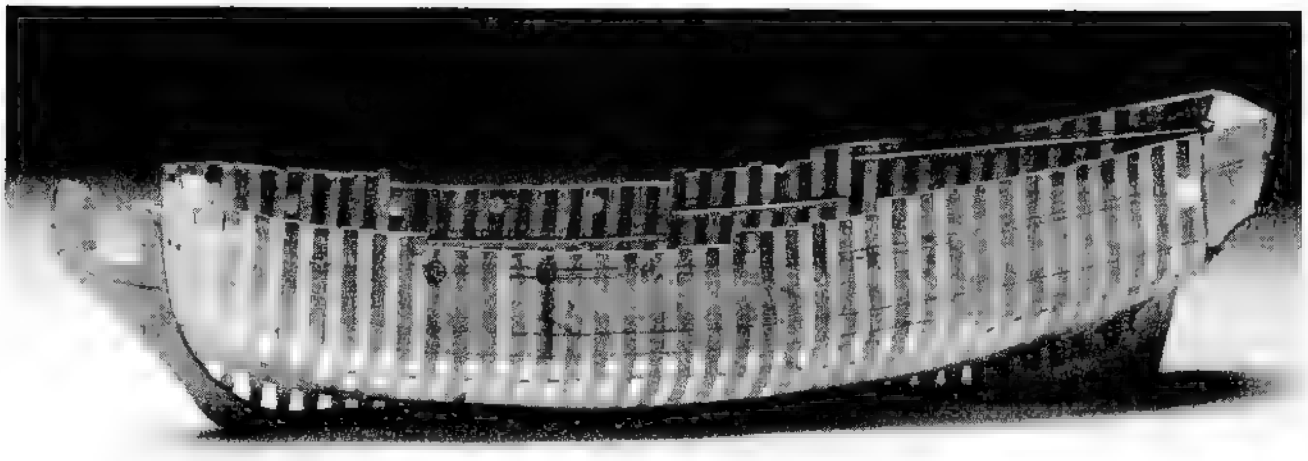


Photo 9. The hull framing completed. The keelson can be seen through the lower framing of the hull. The apparent difference in the color of the wood is due to the change in direction of the grain. Also visible inboard are the deck clamps installed above the cut off ends of the top timbers.

Photo by Gary Lilien

to reveal the lower decks (Figure 22 However, should you decide, as I did, to leave the hull unplanked, then only the Great Cabin (Figure 23, can be installed and what is the poop deck, partially planked over. This diagram shows the beam layout and the location of the quarter galleries at the level of the lower sill (Figure 12, Chapter Two — see the outboard profile diagram)

The reference lines inboard for the underside of the deck should be faired up before installing the deck beam clamps Note that the deck beams vary in depth at different locations (see the framing diagram and inboard profile)

Stripwood, the depth of the beams can be used as fairing battens tacked in position at the underside of the deck marks inboard. The clamps are cut from 3/32" x 1/8" stock pinned and glued in position With the exception of the main deck, there is almost no fore and aft curve to the decks The slight curve of the main deck clamp at the bows can be heat-bent over a small soldering iron with ease. This area will also have to be slightly beveled on the back side as it takes the curve so that it will fit close up against the hull. I like to bore pilot holes for pins prior to installation, then insert the pins so that all there is to do is to apply the glue and drive the pins home

At the poop deck the clamp must be extended to reach into the transom area just short of the beam over the stern lights Pilot holes for the pins are particularly necessary here because there is little room to maneuver in the cramped quarters back there

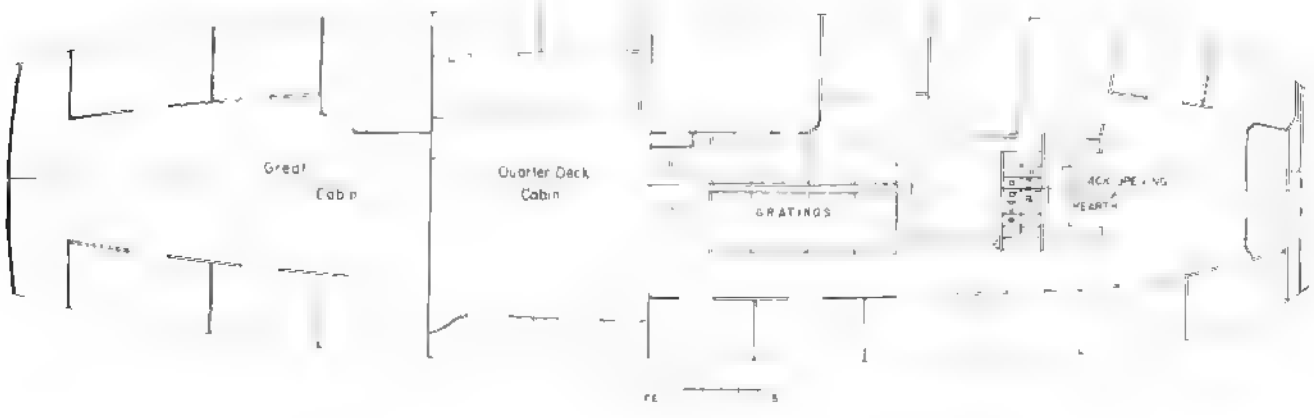


Figure 22

Construction could continue with the installation of the deck beams at this time but I prefer to install the outboard planking because of the rigidity it gives to the hull This outboard planking overlaps the planking of the square portion of the stern For this reason, the planking of the stern should be completed now. Providing that the gilding process at the stern has been completed, the transom should also be permanently installed now. For those of you who have never applied gold leaf — let me say a few words about that first

Traditionally, a substance called red clay is applied to the surface of the area to be gilded to provide a ground (surface) for the gold leaf It also enriches the color of the gold giving it a rosy hue For a cooler gold, a ground of yellow ochre is used The texture of these grounds is similar to flat model paint and for that reason they work as well. I've used Poly-S[5] water based dull red on the model The tremendous advantage of using gold leaf is that it does not darken and tarnish with age It is quite permanent and does not hide or heavy-up fine details. Leaf is supplied in 4" square booklets of about 25 leaves each. The cost is high, but one booklet will do a lifetime of gilding fittings and carvings

The individual sheets of gold leaf are separated by thin tissue and stay in place by static electricity. As frustrating as it is to handle because of this it does have the advantage of clinging to surfaces the same way Still you need a permanent adhesive and traditionally this has been gold size which is really a type of varnish. I have used Val Oil[6] for this purpose successfully and its slow drying qualities have the advantage in this small work The slower the drying, the better the shine

Using Val Oil also permits you to coat the finished surface to prevent it from scratching off. Because you are covering

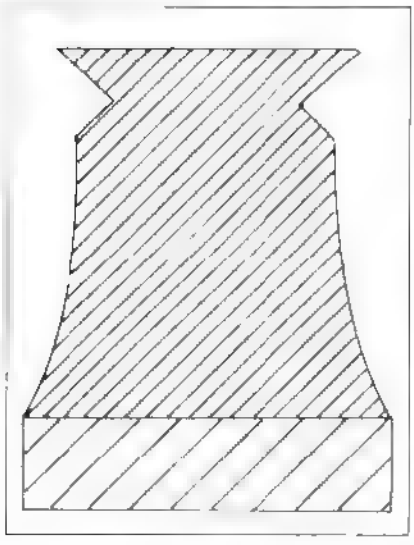


Figure 21

such a small area it's advisable to cut the leaf into small 1/2" squares which are then lifted off the tissue with a #3 round sable haired brush and carried to the desired place. Ideally the surface should be "tacky" when the leaf is applied. Since all that will be done at this time is the window lights and the mouldings, a coat of red clay is brushed on over this area.

A larger area might need to be done in two stages. After the leaf is in position it can be lightly worked in with the brush. The following day the areas are burnished. In full size practice an agate burnisher is used. For our purposes a heavy darning needle will do nicely. It should be tested for burrs on an old stocking. If the needle snags the stocking, try another. The burnishing is finished up with a light rubbing with soft felt to get rid of loose gold leaf. Then you can give the gilded parts a coat of Val-Oil.

The counter on the Greenwich model shows two reclining figures on each side of the sternpost. The background is dark and I assume it would match the painted frieze on the sides of the hull. My choice for the background would be blue with white drapery and gold scrolls. The surface would have to be given a coat of white paint for the colors to be brilliant. Otherwise the wood tones underneath would be transferred to the painting.

The counter should be planked before it is permanently installed on the hull. The opening for the sternpost and rudder have been prepared so you can plank over the whole area and then cut away the slot for the sternpost and rudder port.

Apple was used to plank the model's counter because of its easy bending qualities. The curve was heat bent, then glued and pinned in position. After the slot for the sternpost and opening for the rudder pot were cut, the inboard side of the counter was covered over. A pattern should be cut for this area to assure a good fit. The area can be planked over or it can be cut from one piece of sheet stock 1/32" thick.

If you plan to leave some of the poop deck planking off so that you can see into the Great Cabin, the counter area will have a small settee built over it, if it's furnished, or just planked if the cabin is not furnished. Whichever is done, space for the ends of the deck planks must be allowed for. They will be 3/64" thick where they rest on the wing transom. You may want to try some stripwood where the planking will be allowed for. They will be 3/64" thick

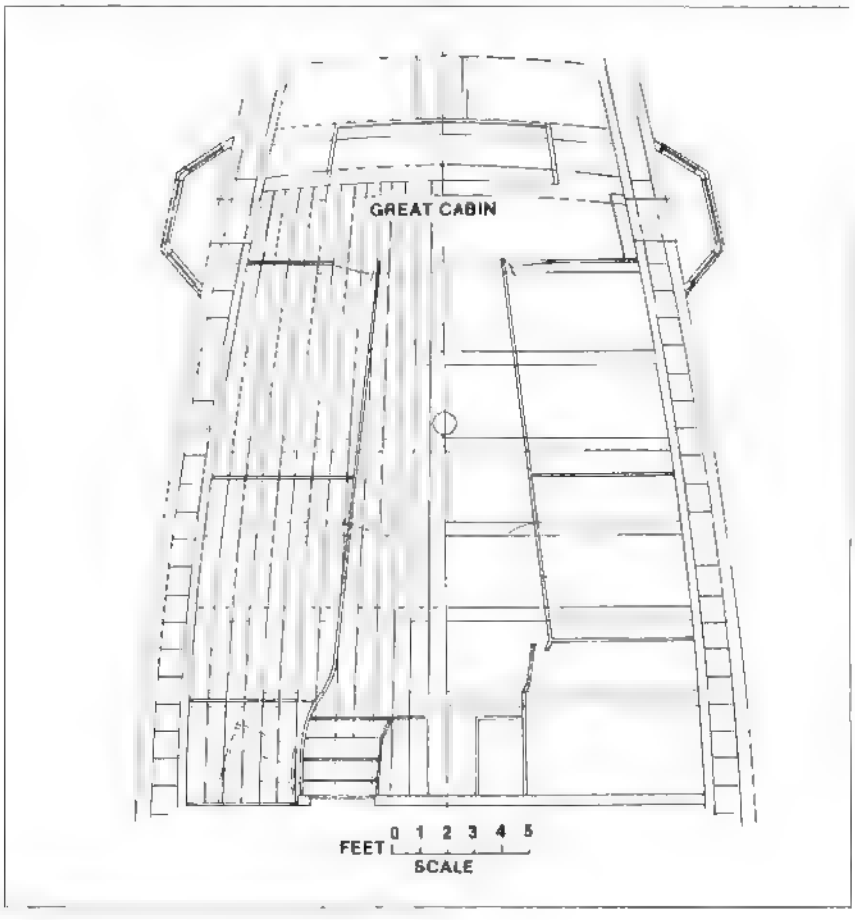
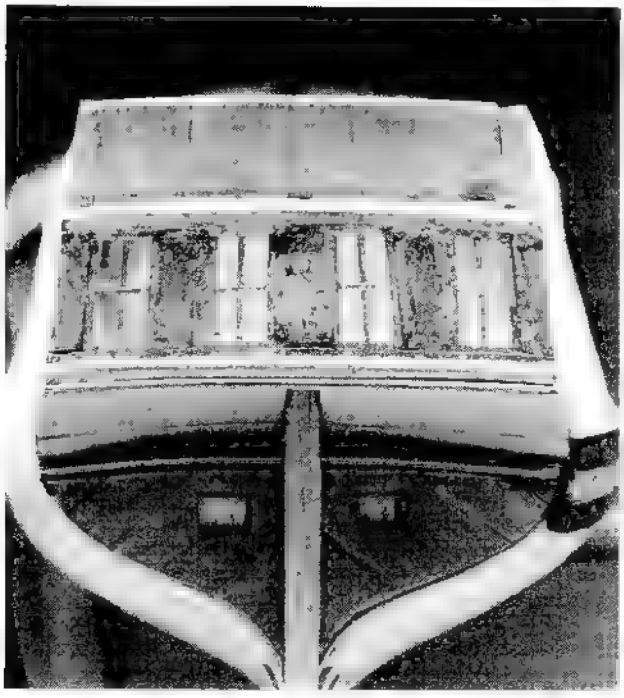


Figure 23



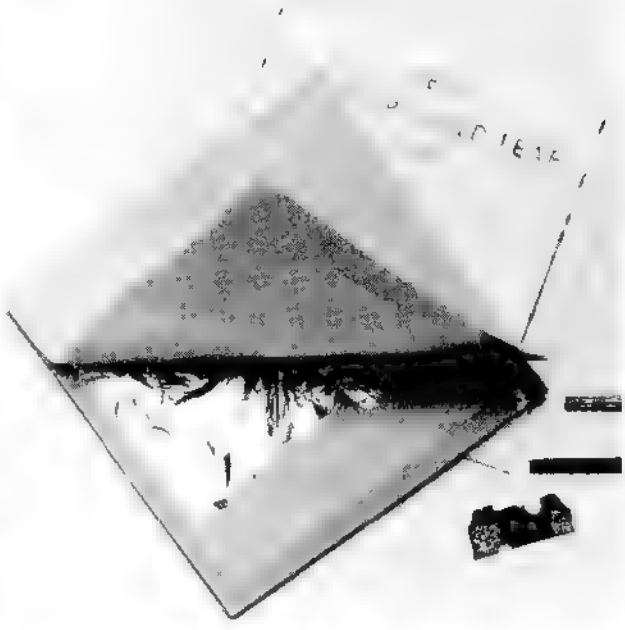


Photo 10 (left) The stern is completed to this point

Photo 11 (right) The moulding cutter and strips are the lower right The shape used for the mouldings is at the lower edge of the cutter The top moulding had had one layer of leaf applied The lower one has just a coat of red ground color

Photos by Garry Lilien

where they rest on the wing transom You may want to try some stripwood where the planking will be before finally epoxying the transom to the hull

Earlier I mentioned that the hull planking overlaps the stern planking from the main wale down The ends of this hull planking are covered over with a thin moulding strip that laps over to the square portion of the stern 1/16" If no planking but the wales are put on, then only the ends of the stern planks are covered The diagonal planks of the stern are shown in Photo 10

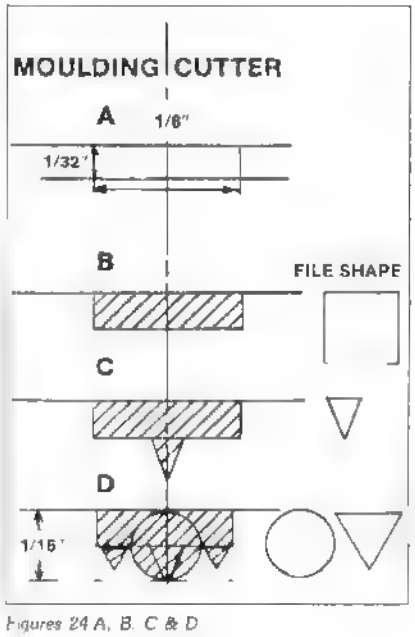
The opening for the ports was cut away as the planking was installed. The fine moulding was cut from 3/64" x 1/16" stripwood, heat bend around the curves, and then pinned and glued into position. Because the material is so thin, you will have to thoroughly wet the backside of the strip Work only one curve at a time beginning with the upper one When that is set, you can cut off the excess that will not be needed and proceed with the other curve

Pre-bore pilot holes for the pins before you glue the strip in place. Then once it's in, sand it lightly with #320 paper Although the one source I previously had no longer carries it, I'm pleased to say that Craftsman does carry this grade of paper Model airplane buffs called it flour paper but it is now known as No-fil ADALOX A239 grit 320 A and made by Norton

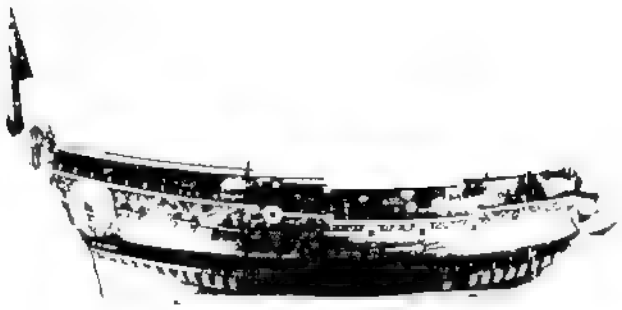
Between the counter and the stern is a moulding that requires making a cutter This same moulding will be used on the sides of the hull, so it's well worth making now. The cutter is made from a piece of scrap steel An old 1/2" wide ruler is perfect for the job You begin by scribing a center line on the steel then add a second line parallel to the edge, but down 1/32" (Figure 24 A, The width of the rectangular shape first cut is 1/8"

Two lines for the sides can also be scribed or, if your eye is good enough, you can center a square needle file over the center line (Figure 24-B) The scrap is clamped in a vise with the scribed line lined up with the top edge of the jaws. This moulding needs a rounded bead and you must start it with a knife-shaped needle file (Figure 24-C) for a depth of 1/16" followed by a round file and triangular file (Figure 24-D) A length of stripwood is prepared 1/8" wide x 5/8" thick x 12" long One end is clamped in a vise and the cutter is grasped firmly in two hands and pulled towards you — first with light cuts and as the pattern emerges more pressure can be applied (Photo 11) The strip is then run through the saw on the Unimat 1/16" below the bead. This will allow enough room for the hull planking, but additional material should be removed for the counter moulding, and this can be done by sanding the backside for a distance of about 4½"

The remaining material can be set aside for use on the hull The other two edges of the wood strip can be moulded and then split for use later. The short length that will be placed at the seam between the stern and the counter is first bent, then cut in two. Gluing and pinning are followed by a light sanding The stern, as completed to this point, is shown in Photo 10



Figures 24 A, B, C & D



5

Planning For Placement

Planning ahead for steps that must follow is a large part of ship model building made easier by a full set of plans. Without them, all that can be hoped for is a "best estimate" of what went where historically and what might have been used. Not all modelers are "created equal." For some of us, the hundreds of details in a model are what make it such a fascinating hobby and one which will continually hold our interest.

Thus far you have had a glimpse of some of the details for FUBBS. The breakdown of the areas for the great cabin, quarter deck and lower deck held some surprises. I wouldn't have wanted to guess at the location for the hatches on the lower deck because I would surely have placed them equally spaced and the same distance from the centerline.

As the plans showed, this wasn't so. The rather large cabin on the port side shifted the hatches to starboard. They also indicated the runoff for the water collected in the manger at the main deck level was channeled through the side of the hull at the bows of the lower deck.

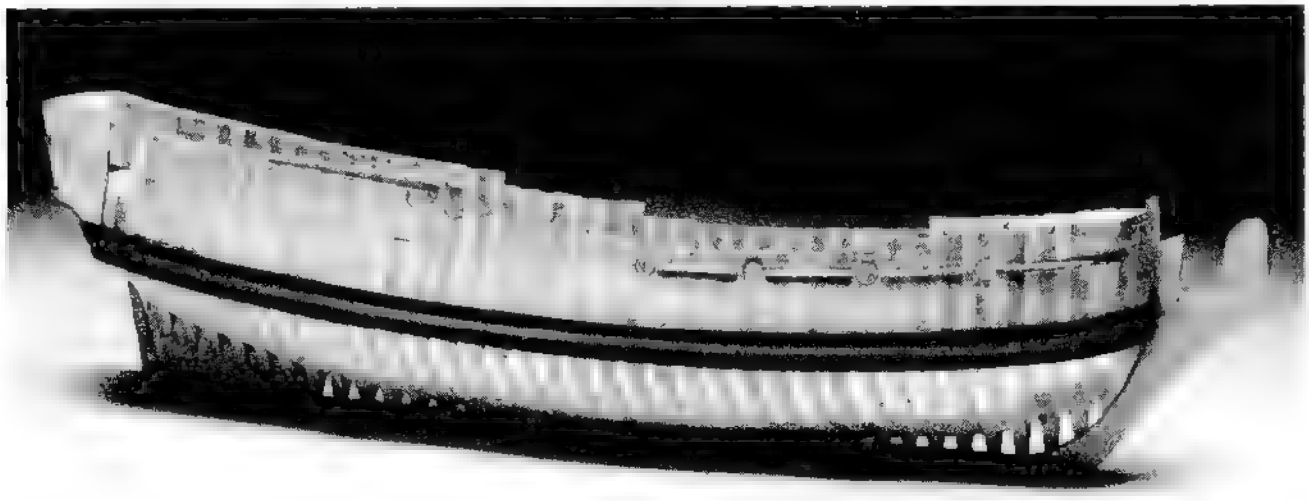
Due to the hull shape here, some of the cabinet area in the galley is placed in what is called the wings, where inboard it's more wedge-shaped than box-like. I was still not completely convinced of the marked out area on the port side of the stairs when it came time to work up the deck beam layout for that deck, for it seemed impossible for anyone but a small cabin boy to pass unobstructed from the galley moving aft past the stairwell. For this reason I moved the partition back in line with the adjoining cabin.

For those who have planned to install that lower deck, you might find that passage would not be difficult and prefer to place the partition in the original position. There is considerable interest in the decks from the great cabin to the main deck as seen in Figure 25.

Beginning with the great cabin aft, parquet flooring would be used in lieu of simple deck planking. Of course this whole area can be skipped if you plan only to show the poop, quarter deck and main deck. I had decided to show the great cabin with its partitions and perhaps some

Photo 12. Because the carvings overlay the planks at the stern, the wales are brought all the way to the outer counter. Portions of the gold leafed mouldings bordering the lower edge of the frieze have been tacked in place with pins, but will be permanently installed after the frieze is in position.

Photo by Gary Lillien



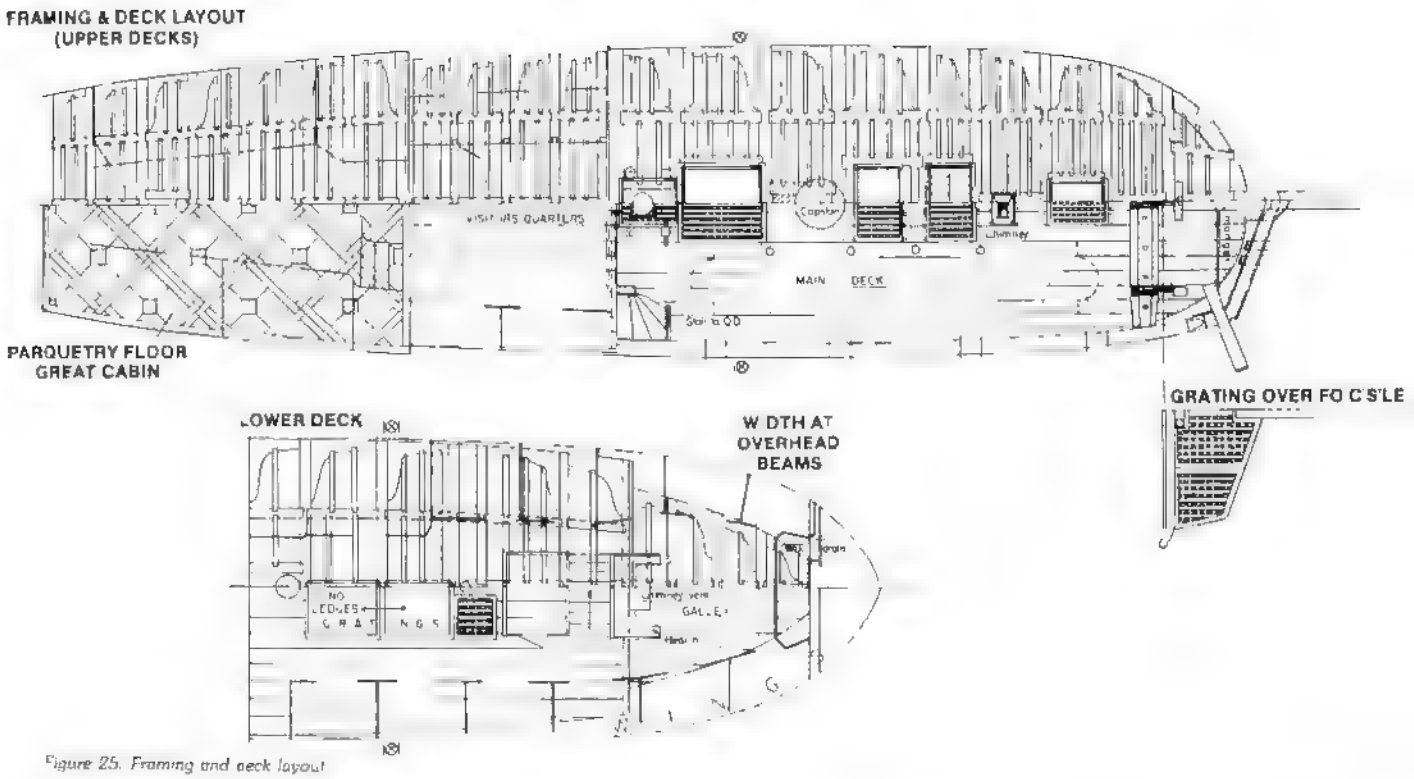


Figure 25. Framing and deck layout

furnishings even though I planned to rig the model.

The quarter deck needs no explanation but the main deck does. The heavier deck framing is to be expected on the main and quarter deck because these decks carry the guns. The Greenwich photo shows no evidence of carlings ,fore and aft auxiliary beams), mid way between the center of the decks and the sides. The beams appear much lighter, as do the ledges (narrow cross beams between the heavy beams), in the exposed portion of the deck where the planks have been left off. It probably is just cosmetic because there would have to be knees tying the beams to the inboard side of the hull. The area where the planks were removed is outlined with a dashed line in Figure 25. A decorative paneling covers the inboard side of the bulwarks, complete with mouldings.

Inboard, the port openings are surrounded by a simple band of wood. A curved staircase gives access to the quarterdeck. Simple log pumps flank the main mast and a pair of single bitts stand just forward of it. On the Greenwich plans, there is no capstan indicated. However, since there was no change in the rig of the vessel, I followed the lead of the photograph of the FUBBS model and located it just forward of the main hatch. The foremost hatch forward of the two hatches is the opening for the ladderway, followed by the galley stack, offset from the centerline.

Prior to 1724 FUBBS had a beakhead bulkhead at the cat beam. After her rebuilding, the cat beam connecting the two cat heads was eliminated and her bows filled in up to the rail, forming a wedge shape. The old half deck over the fo'c'sle was retained and was fitted in with gratings. Half hidden under the after end of this short deck was the old log windlass.

On the 16th of July, 1632, Phineas Pett wrote to the Master Attendant at Chatham for the following supplies to be provided on loan for the launching of the King's new yacht FUBBS. The yachts bilgeways, Launching Plank 640 feet in length, ways and caps, 80 in number, ribbons, 260 feet in length. Compass spurs to run from the bilgeways up to the weale (wale) to be in length 13 feet to 15 feet, 12 in number, a piece of old mast for her windlass of 18 feet long and 2 feet through, wrought.

Although the masts and spars were ordered made from his majesty's yard at Deptford it appears that the log windlass was not considered a part of that order.

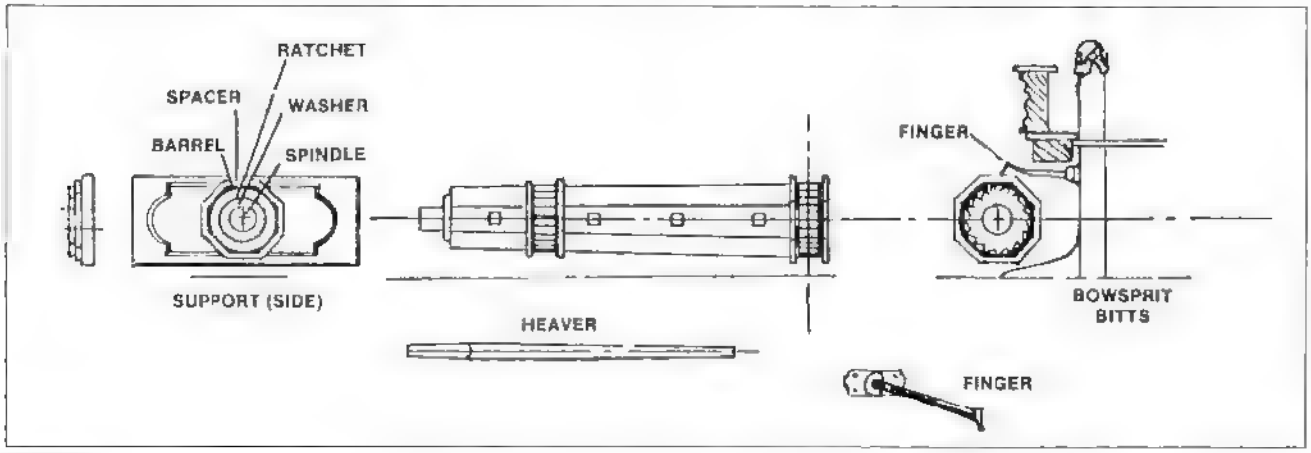


Figure 26

Pett promised to return the "borrowed" items as soon as the yacht was launched but it seems unlikely that the winclass was among the borrowed items, especially since he gave the dimensions and directed that it be wrought. Presumably the seasoned wood of an old mast was desirable rather than an economical reason. It's also presumed that the windlass was retained during the rebuilding since a new one does not appear on subsequent lists.

The log windlass is shown in Figure 26. It is supported at the ends by spindles which fit into the decorative panel at the sides. The barrel is eight-sided with alternating sides pierced with square holes for the heavers. At the center and near the ends are ratchets let into the barrel. Instead of pawls to counteract the forward thrust of the barrel, there are three finger-like rods fitted with brackets that are secured to uprights supported by knees. The central bracket fastens to the back side of the bowsprit bitt. The fingers work on a simple U-flange with a bolt running through at the inner end. The "U" is an integral part of the bracket.

Up at the bows is the manger. As the anchor cable is brought in it carries considerable water with it. In order to control its flow, a shallow trough, built with strong boards, cuts off this section from the rest of the deck. Lead pipes lead below decks and connect to the drain two feet below the deck beams of the main deck.

The only unusual feature aside from the offset hatches on the lower deck is the hearth area. A portion of the hearth is on the main lower deck; then it drops down to the level of the galley deck. Galleys of this period aboard royal yachts were not the cramped steamy quarters found aboard men-o-war. Clean linen and plate along with fine china and glassware were royal requirements that were often stored in paneled cabinets fitted especially for their use. Supplies for the cabin boys and stewards were also quartered there. When you think these things were used on a daily basis for weeks at a time, it comes as no surprise that considerable space was required to house it all.

If you plan to leave planks off the main deck to reveal the lower deck and all its trappings, there will be considerable interest at this level. You'll note the wide deck planking that seems to be a feature of this period on this and the other decks. It seems an extravagant use of wood indicating a lack of concern for the waste factor on the part of the builders, or, it may just be the method used by the model builder.

This presents no problem on the decks but certainly does on the exterior planking of the hull. The reason for this is the combination of compound curves over a relatively short length. This size plank on a hull half again as long would be a lot easier to handle, but more about this later. If this deck will not be shown, all that will be needed are two beams to support the ladderway.

Even without installing the lower decks, there are still about 20 deck beams with their carlings and ledges to cut out and to set in the camber (curve) of the beams. This job is made easier with the use of a bending jig (Figure 27). The time spent building this simple device will be well worth it. The main body can be used over with only a change in the end pieces. The base is constructed of plywood. The bottom and sides from 3/4" ply and 1/4" thick ply for the overhanging top on each side (A). The end pieces are cut from 3/8" thick pine. The base of the jig has three slots cut through the bottom to hold rubber bands.

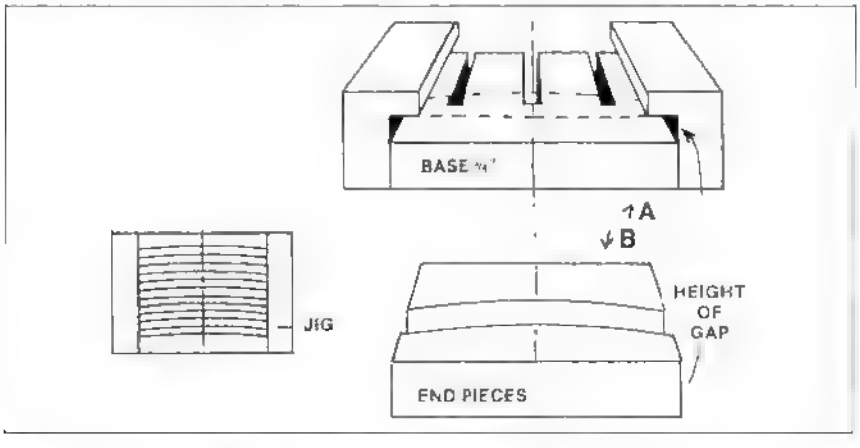
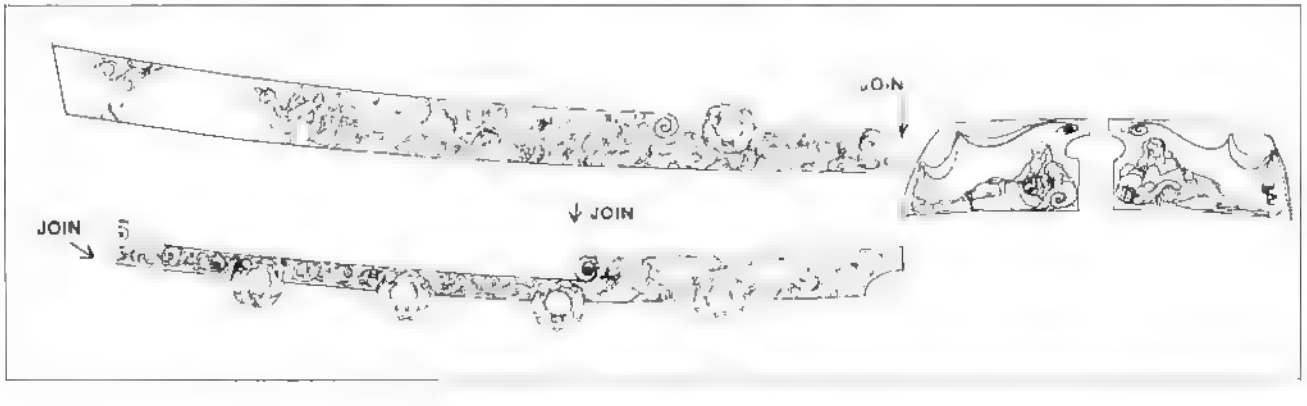


Figure 27

The size of the base is 6" x 6½" x 3/4" thick. The side pieces are 6½" x 1¼" x 3/4". The end pieces are 6" x 3" x 3/8". A tracing is made of the deck camber with a centerline. A centerline is also drawn on the end pieces block. The tracing is then rubber cemented to the upper face of the block, then it is cut into two sections along the curve of the deck camber (B). The small inset shows the planks fitted between the end pieces.

This jig is larger than required for the beams of FUBBS, but it is still a good idea to make it large enough to accommodate several models. I used a scrap of wood

Figure 28



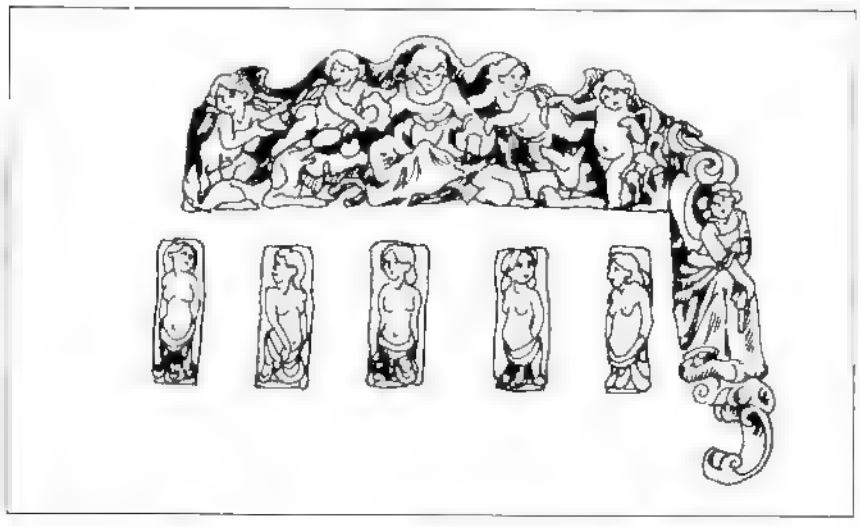


Figure 29

over the tops of the wet beams and it was held down by the rubber bands. If this is not done you will find the beams popping out as they begin to dry out. After cutting out strip stock for the beams, I cut 5" lengths for all of them. They would be trimmed later as they were fitted. Each was given a center line and then put to soak for 24 hours.

While the beams were setting, up work proceeded on the outboard planking. The Greenwich plans revealed the retention of the old double wale system while the photograph showed that the gap between the two had been reduced by the width of one plank.

Above the wale there are three wide planks up to the boundary between the planking and decorative frieze. These wide planks are about 5/16" wide and 1/32" thick. The wales are 1/16" thick and 1/4" wide.

Earlier I mentioned heat bending with the use of a small soldering iron. For those of you who have not tried this method before I should say something about how it's done. I have a small jeweler's vise with jaws 1½" wide that I clamp to the bench which is ideal for grabbing the handle portion of an X-Acto soldering iron. The amount of curve required governs the amount of concentrated heat given an area plus the thickness of the material.

Keeping the wood to be bent in motion prevents burning while it's pulled over the iron. Apple gives a distinct fruity odor when it begins to char, telling you that you've been a bit heavy handed. On a thick plank this might not be too critical but it can ruin a thin one. The heat applied shrinks the wood, so as it's moved over the hot iron it should be pulled in the direction of the curve. Sometimes, especially in the case of Ebony, a combination of some steaming and heat bending is required. This is especially so for the portion of the wale that curves around the bows.

Not only is the plank S-shaped, but it also takes a quick turn. The S-shape should be filed into the plank portion prior to bending because you will never get it in any other way over that short span. The planking should start at the bows working aft. All the planks taper towards the bows and flare some at the stern. For this reason the stock for the FUBBS planking was cut slightly oversize on the table saw, then sliced on the Unimat saw to the thickness required.

After setting the curves on the strips of planking the sections requiring taper and flare were filed to shape. Since each of the planks would be glued and doweled, I took time out for the task of pulling dowels down on a #57 drill size from lengths of bamboo. I still feel this is the best material for the job because of its strength. However, there are commercial ones available which will save hours of tedious work and they probably would do just as well. I just haven't gotten to it yet. The upper wale is cut into by both the quarter gallery and the carvings that trim the ends of the planks at the stern. However, these carvings overlay the planks on the Greenwich model and I planned to do the same so the wales are brought all the way to the lower counter as seen in Photo 12.

Also seen in the photo are portions of the gold leafed moldings that border the lower edge of the frieze. They have been tacked in position with pins but will be permanently installed after the frieze is in position.

The next major job will be the construction of the decks and inner works. Before starting, I felt it was important to prepare the wood stock for the frieze. A tracing was made of the whole area, then it was broken into three units with the largest covering the quarter deck and poop area. Next came the waist and then the raised portion forward to the cat head. These tracings were then rubber cemented to some 1/32" holly and cut out on the jig saw.

Another tracing was made of the entire strip in order to plot out the design of the frieze in a continuous flow. The photographs of the Greenwich model show this to advantage and with the aid of a magnifying glass some of the smaller details could be picked up (Figure 28). Included in this figure is the design for the painted over counter. The design for the frieze was then traced off onto the holly strips and then given a coat of Val-Oil to preserve the line.

The choice of holly was no accident. I wanted a truly white wood that would not change dramatically with a coat of varnish.

The figures on the frieze are mostly nude with delicate flesh tones. If the underlying wood were dark any overpainting would be toned a deeper value and some of the delicate figures would become heavy looking if they were painted opaquely. The holly wood provided the correct tonal value for this method of painting.

It's possible at the time the FUBBS was originally built that this frieze area was completely carved. However, in keeping with the new establishment, the frieze replaced the carved look. Dark backgrounds, such as blue and black, were favorites of the period. A dark blue is used on FUBBS with flesh tones and gold accents. Because, then as now, gold was expensive, gold paint was used extensively as a substitute. Some 40 pounds worth of gilded skins were used on the interior of FUBBS during her 1724 refit, much of it probably being used as wall coverings between panels.

Because the deck beams had to be done in batches, not all had dried by the time the planking had been completed. Meanwhile, I decided to try making the parquet floor for the great cabin. A substrate of 1/32" thick oak 7/8" square. Separating the squares is 1/4" banding used in marquetry.

The squares are placed diagonally beginning at the centerline of the floor and spaced to allow for the banding to run between the groups of squares. These were glued down with Titebond® and then set to dry overnight on a narrow board with a shim down the center to set

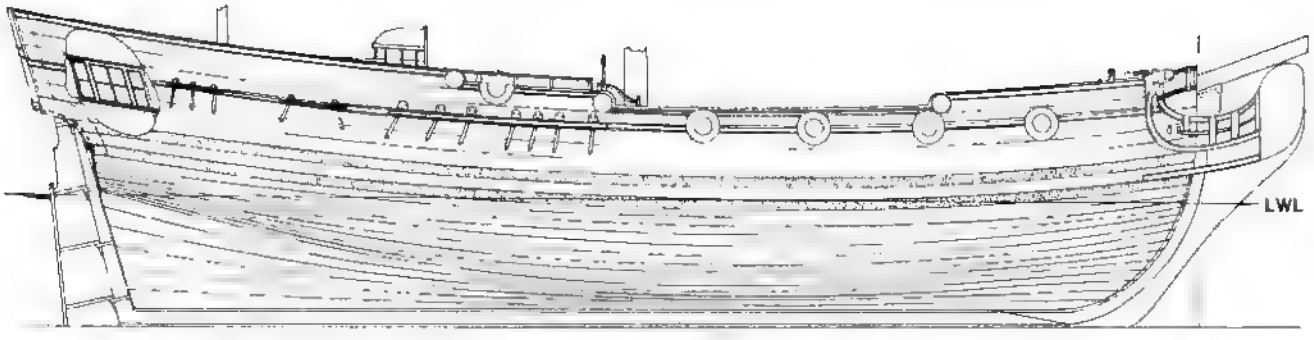


Figure 30

the curve of the deck. The following day the whole surface was sanded, removing about 1/64" of the surface and then it was sealed with a coat of Val-Oil

When the surface was dry, I decided to divide the large squares into four by drawing a fine ink line through the center. Still not satisfied with the look, I added a small square (3/16") in the center of each large one and painted it sienna brown. It was just what was needed for a spark of color. While working in that area I made a tissue pattern of the cabin walls which could be worked on at a later time.

There is considerable carving to be done for this model and I like having a piece of wood with me at all times to work on in spare moments. I've even whipped these out on airlines using just the X-Acto knife and #11 blade without setting off any alarms Applewood was again the choice and sections were cut out for the stern areas (Figure 29)

The five small figures between the windows will be carved from one long stick. In this way they can be compared with one another and I'll have the convenience of something to hold onto while working rather than little chips that could fly out of the hand too easily

The portion above the windows is one block that will be shaped on its back side when complete and the side pieces are again carved from a single stick The drawing was made by tracing the figures from the Greenwhich photo, then carefully redrawing them for carving purposes The ends of the side planking are covered by a simple scroll and this will be carved in tandum with its mate — again for comparison With all of this now completed, attention could be directed towards getting the decks built and planked

6

Stern Lanterns And Capstan

Few things in model building consume as much time as the small details which add so much to a model. For me, they provide the breathing space needed to solve other problems before they are committed to paper. Happily, details can be worked on at any stage of a model's construction and, therefore, aren't out of sequence. The convenience is worth the trade-off of pain and frustration when you must tackle something for the first time.

In general, there are two or more of everything to be made for a model and so you have a chance to improve on the first attempt and perhaps to discard it in favor of the better solution. These "first" times occur when there is a change in period and type of vessel. Although some procedures are constant through all periods and types, there are enough that aren't, making it a whole new challenge.

Two of the items covered here are the stern lanterns and capstan. There are four lanterns to make, but I wasn't sure of their shape. The capstan needed less digging because it is shown on the Greenwich model and the only real question was whether or not the spindle, where it went below deck, was boxed in. Close magnification showed that it wasn't. It carries the usual drum head but there are no iron bands to confine the whelps. The drum head has 12 openings for bars, and there are only six whelps, but more of this later. I'll begin with the lanterns.

STERN LANTERNS

A distinct feature of the early Stuart yachts are the stern lanterns, set like glittering jewels high above the taffrails, supported by brackets in the transom. The earliest paintings depict these lanterns as globes and later as tapered, flat sided lanterns. The transition appeared to occur about 1720, yet there are examples of the globes still in use as late as 1735.

Neither the Greenwich model nor the plans indicate which was used on FUBBS, so I had to turn to the pictorial evidence available for confirmation of a possible change in design when the refit took place in 1724. The earliest date for a painting of FUBBS is recorded in Gavin's *Royal Yachts*. It appears opposite page 60 and the caption reads, "From a painting by William Van de Velde the Younger, in the Kaiser Fredrich Museum, Berlin." The date of Gavin's book is 1932, prior to England's entry into World War II.

Since that time, the painting has reappeared in two small publications of *Royal Yachts* issued by the National Maritime Museum where the painting now resides. The first publication was compiled by G.P.E. Naish in 1953. He again states that the painting was done by Van de Velde — but this time the Elder, in 1684 (Plate 4). The second publication, dated 1977, was compiled by A.P. McGowan (Plate 8). He tells us that the painting represents the ketch-rigged yacht ISABELLA 1683, and that it is attributed to Peter Monamy (1681-1749), who was a house painter by profession.

Many of his works in the National Maritime Museum reflect a variety of styles and a close resemblance to a number of painters. One painting shows a small boat in the foreground similar to that in the FUBBS(?) painting, and perhaps this lead McGowan to assign the work to him.

However, the stern decorations and in particular the painting on the lower counter point to the Van de Veldes. The catalogue of drawings of the Van de Veldes in the National Maritime Museum shows a sketch (Plate 166 #738), of a stern view titled "The English Ship Seahorse — Younger 1701 (?)" It is the same as that on the counter of the ketch-rigged yacht in the FUBBS(?) painting.

As time goes on I became more convinced that the Greenwich model is FUBBS as she originally was. This would mean that the distinctive painting on the counter of the two reclining figures should

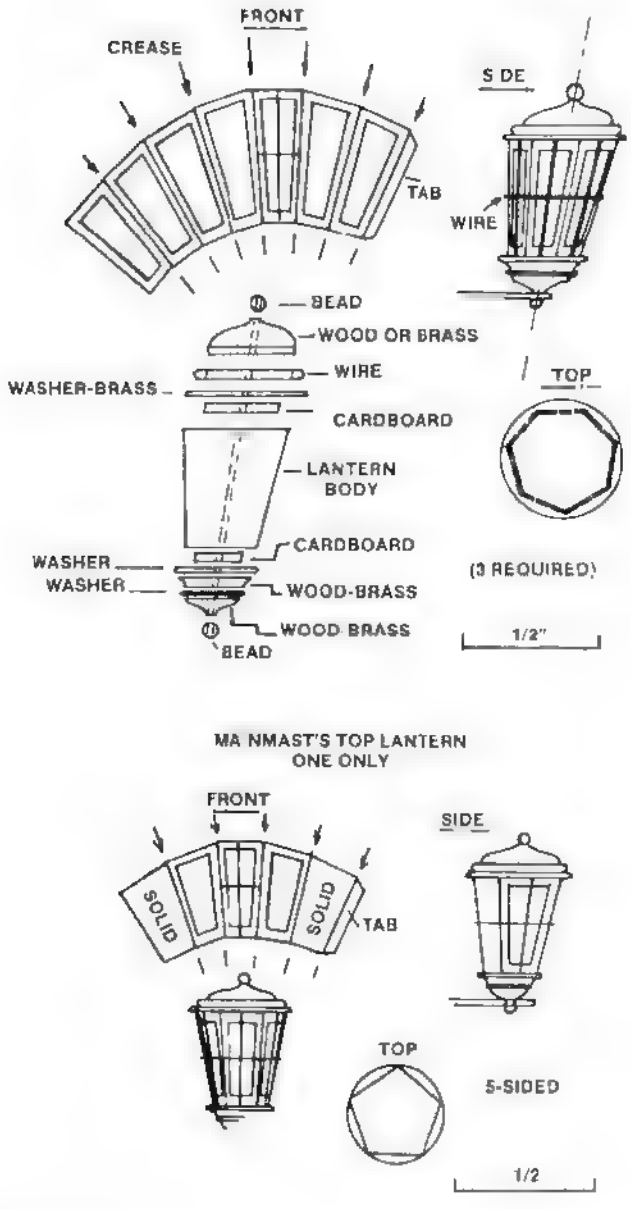


Figure 31 Three stern lanterns (7 sided)

be seen in a painting of her, certainly up to 1724, and possibly after the 1749 refit, however engravings after that period show a more austere appearance at the stern The ISABELLA was the only other ketch-rigged yacht at that period (1683). She carried only eight guns, and the FUBBS(?) painting indicates 12 It's likely that this is a Van de Velde painting and that he borrowed his own counter decoration. I doubt this is either FUBBS or ISABELLA

Another painting in the Nash compilation shows a detail from a larger work by Charles Brooking (1723-1759) It's caption reads, "Ketch-rigged yacht, close-hauled, with the port tack on board, in a fresh breeze. A Royal Yacht, because she flies the jack and naval pennant " Brooking too, was a copiest, but always in his own style and pallete The painting bears a remarkable resemblence to the Greenwich model including the painting at the counter. In it is shown three stern lanterns again raised high with their bases in line with the taffrail. A fourth lantern can be seen in the main top. All of them are the flat sided variety. They are still large (3"-4" high) unlike those shown in later engravings (1761) where they appear smaller and are placed lower down on the transom

Unfortunately, there is no date on this painting, and the window arrangement, though similar to the Greenwich drawing does not concur with the stern carvings that were transferred from the original yacht. It resembles FUBBS at a much later date from that standpoint, yet the freeze at the sides match the Greenwich model, as do the placement of the gun ports

Before constructing the lanterns, I made a wooden model of the shape to determine the size and proportions that would suit the model. These lanterns have a peculiar shape. They tip forward and, with the exception of the middle one, tip away from the center line slightly. When completed, these lanterns have a jewel-like quality and although the job of making them seems a bit formidable, it's a lot easier if taken in sections (Figure 31). Mine were made of brass with a copper support wire but there is no reason why the turned tops and bases couldn't be made from wood and painted or gold leafed.

The lantern body is made first, from shim brass, following the outline of the pattern in the figure. The pattern must be reversed for the opposite lantern. The pattern for the central one and that of the masthead light can be cut at the same time The fold lines should be weil scribed on the surface as guidelines as well as those for the inner cut-out portions The folds must be made prior to removing the material in the openings as it will be impossible to do so once the cut-outs have been removed

In preparation for this, the shim brass is heated to facilitate the cutting and later soldering of the piece The problem faced in removing the brass in the cut-outs was keeping the edges clean and sharp without warp. The answer was to grind that portion away rather than cut or drill it out A shallow leak-proof container was needed to hold water for the grinding operation and I found a 3" round plastic box about 3/4" high to be just the thing

To support the work, I used a 3/4" square piece of pine about 1/2" high Water was added to keep the grinding wheel cool and to speed the cutting process. Without it you will burn out the grinding wheel and slow the work I used diamond coated wheels for the grinding that were 3/8" in diameter, but ordinary ones will do as well

Removing the brass begins in the center of the opening to be cleared Once you're through the brass at the center you can work towards the fold and the scribed line for the upright Cutting the first slot is done on top of the wooden block — with everything wet — then as you work towards the fold edge the piece is moved to overhang the edge of the block After you have made the folds, the piece is slightly flattened again so that it can be held steady on the block. Burrs can be removed with a needle file and then gone over with fine wet and dry emery paper This is the messiest part of the job, but stick with it and cut all the openings for all the lanterns at this stage

Soldering The side joint is next, so the pieces must be clean After washing them in detergent and rinsing well, re-fold them and cut the top and base covers from squares of brass shim about 1/32" thick The base piece follows the shape of the flattened sides of the lantern but the top is round. Mine were spun out on the lathe but they can be filed to shape as well Wait to file the bases after soldering them to the

antern body I x⅜ soft silver solder was used throughout. On the first job I used a butane torch I did subsequent solderings with the cooler small X-Acto soldering iron. The side seam and the base were done at the same time on all the lanterns, then each piece was thoroughly cleaned

The next step involved the application of the window munions. These are made from short lengths of fine brass wire, cut a little over-long with one end bent back to hook over the top edge of the lantern. This holds them in place while being soldered between each of the openings, at the base and top edge The little hooks can be cut off and filed flush with the inside later A circle of brass wire divides the openings halfway between the base and the top edge, with the joint at the back The tops of the lanterns have a base plate with a ring of wire (1/16" diam.) set in slightly from the edge, and a shaped top finished with a bead. The wire ring was soldered on, cleaned up and set aside for later assembly

The next job is turning the tops and bases. Bar stock was used for both — the top 3/8" diameter and the base 5/16" Prior to turning the shapes the rod was bored, off center, while spinning in the chuck The tops have a squat onion shape and below the point where they would be covered by the ring on the top plate Enough stock was left on so that the bottom face could be angled on a sanding disc after parting off the piece from the lathe I used a #64 drill, just a hair over the size of the copper wire used to thread the assembly together. I had some small silver beads to answer for the very top

The inserts which hold the glass in position were cut from heavy cardboard about 1/16" thick. The one for the base had to be epoxied in position before the glass was fitted. This one can be round and its diameter should be governed by allowing about 1/32" clearance for the glass A rather large hole is bored through the center to allow for the angle of the wire passing through

I stress the use of glass over plastic because of its sparkle Cutting strips of side glass isn't really that difficult. I use an X-Acto blade (#11) with its tip burned over. It does a good job of scratching the glass — just remember to hold the knife at right angles to the glass while scoring. Two-ply bristol makes a good surface on which to work The edge is the right height from the work surface to be able to line up the scratch and press down with your thumb for a successful cut. They can be trimmed to the proper length with a pair of flush end cutters Holding these minute pieces of glass in position is made easier by scraping a little paraffin wax off with the bottom edge of the pane The smallest amount will be enough to hold the pane in position while the next one is being inserted

Once they're all in, the top insert will have to be fitted This one needs to be angled to follow the contours of the upper edge of the lantern. It should fit just below the top edge of the glass It, too, needs a large hole through its center. When you have a good fit, the top plate can be put on and the lantern inverted for soldering The turned portion of the top with its guide hole will be used to locate where the hole must be drilled through the plate, but first the piece has to be beveled. Do this in stages until you have the proper direction, then it can be placed on the top plate and the drill bit guided through just far enough to mark the surface of the plate

The same operation is used for the base turning I suggest first drilling a small pilot hole, then following with the #64 drill bit On my lanterns, the bead was soldered onto the wire prior to insertion through the lantern's various pieces At the bottom it was pulled tight and then soldered to the base turning. The lanterns were given a final polish and then lacquered to protect them from tarnish (Photo 13). These small treasures were boxed up to protect them from dust until ready for installation

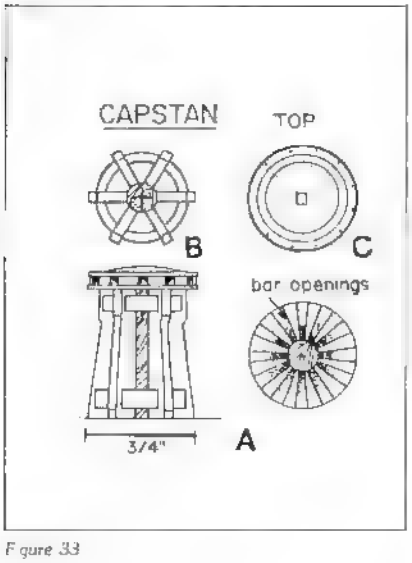


Figure 33

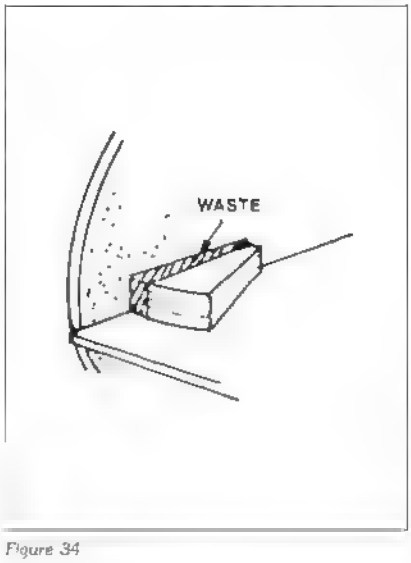


Figure 34

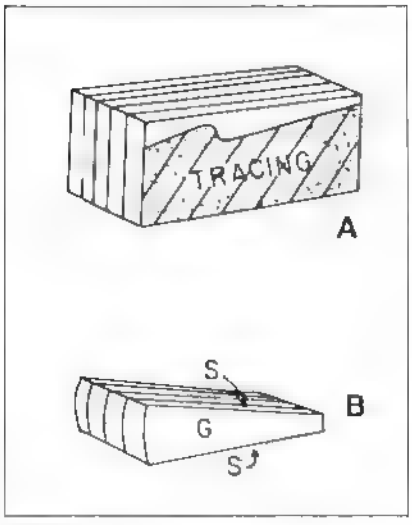


Figure 32

SIMPLE, TYPICAL CAPSTAN

The capstan for FUBBS is a simple one, typical for the period, with its pawl fixed in the deck The six whelps act as stops that prevent the barrel from reversing direction. It turns on a vertical shaft that passes through stout partners between the deck beams The drum head has 12 openings for capstan bars

On the Greenwich photograph there appear to be no iron bandings securing the whelps to the shaft or spindle Spacers are positioned several inches above the level of the deck and just below the drum head

CONSTRUCTION

The capstan is composed of three basic parts the spindle, drum-head and barrel. With the exception of the spindle, the parts are made from multiple pieces of the same shape The drum-head has two disks (one top and one bottom) Its inner works are a series of wedges placed around the spindle. The gaps between the wedges form the openings for the bars (Figure 32-A). The whelps are six in number, and radiate from the spindle Figure 32-B).

Cutting multiple shapes of the same design can be done in several ways I've found the best solution is to take a length of sanded stripwood of the required thickness and to cut it into the number of units needed These are rubber cemented together side to side, then the ends are sanded square. A tracing is made in this case the whelps, and this is rubber cemented to one of the sides (Figure 33-A). The required shape is filed or sanded as needed

In the case of "B," the wedges for the drum-head, the glue will be applied on the wedge-shaped portion, so the fine sanding must be done on the thin edges No more than four should be done at one time because the dust from the sanding works into the cracks and can loosen them before

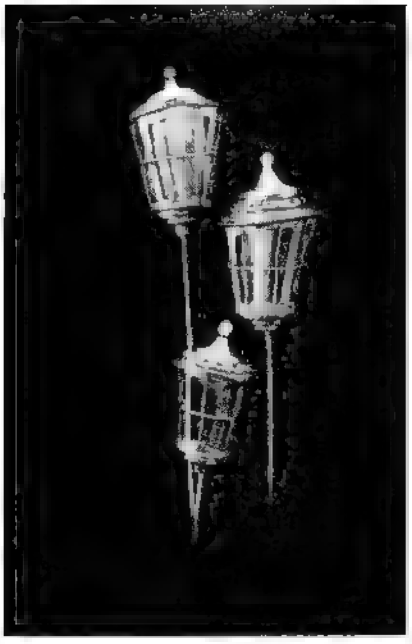


Photo 13. These are three of the completed stern lanterns. The lower left one is on the mast head. The middle right one (for the starboard side) shows their canted shape. The upper left lantern is located mid ship. Photos by Jerry L. Jhen

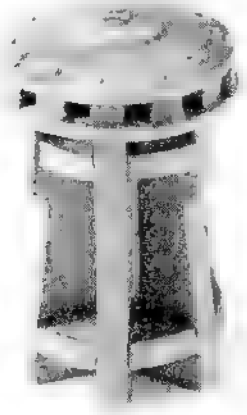


Photo 14. The completed capstan.

the wedge is completely shaped.

Two disks form the top and bottom of the drum-head. The lower disk can be cut from 1/32" thick stock. The top rounds up in the center, so this can either be made in two parts (a disk and a thicker piece rounded to shape) or turned in the lathe. I knew I would be turning up other round sections for additional deck furniture so I just included the drum-head top on my list. A 2" length of straight apple limb was used for these small turnings. The center of the top has a small pilot hole drilled for the bolt that secures it to the spindle. It was drilled deep enough to give a location hole for the lower disk. The hole there was enlarged to 3/15" to fit over the spindle. If you are cutting these disks by hand, first make the hole and then shape the outer edge. This keeps the wood from splitting.

If you who are turning up wood for the first time, remember that these small parts heat up quickly and can become brittle. Have a damp sponge handy and wipe after each turning sequence to cool it down and return moisture to the wood.

The drumhead is assembled as a separate unit. A tracing is made of the layout of the wedges (Figure 33-A). The radiating lines are extended beyond the limit of the disk's outer edge. The lower disk is placed over the tracing and wedges are aligned with the pencil marks. After the glue has dried, the top can be applied and pinned (Figure 33-C). Fine wire will do nicely for the bolts.

Cutting the whelps has been covered but not the supports between them. In Figure 33-B there are two rings indicated. The inner ring indicates the upper support that has a curved wedge shape, as does the lower one shown as the outer ring in the figure. Two tracings are made, one for the upper and one for the lower support. These are rubber cemented to the stock.

The narrow spaces between the supports drawn on the tracing are cut away with the X-Acto knife. The pieces are separated with a razor saw. The waste material is disk sanded off (Figure 34).

Before assembly of the capstan barrel can begin, the spindle should be cut and shaped. It will extend to the keel and be tapered from the underside of the deck beams. The portion above will have parallel sides. For ease of installation the spindle can be made in two sections with the upper part pinned to the lower through the center of the spindle. In measuring the length of the dowel, allow for the portion that fits into the drumhead. With the lower spindle in place you can proceed with applying the whelps to the upper dowel.

Mark the location of the supports on both sides of each whelp or, better yet, cut a scrap wedge the height from the deck to the underside of the lower support that can be slid under the permanent one while it's being glued. It's a faster method and can be used for the upper support too. You'll have to invert the barrel and insert the upper portion of the spindle in a scrap of plywood, bored with a 3/16" hole.

The supports are inserted using the same procedure as before. Once dry, the drumhead can be glued on. It should fit easily over the exposed portion of the dowel. Every other opening in the head lines up with one of the whelps. A square of brass and pin will serve as the bolt for the top (Photo 14).

The final element is the pawl that fits in the deck. This is made of two parts, the pawl and the stop (Figure 35). There is a bolt which passes through the top of the stop portion, pawl, and through the deck. Four bolts also go through the flange of the stop. This small mechanism must be assembled using both silver solder and lead solder. If you want an operative pawl, then a solder inhibitor must also be used.

After shaping the brass tube that forms the body of the stop, it gets silver soldered to the base or flange. This can be a scrap of square brass that is shaped after soldering. Tix soft silver solder is perfect for the job. I've seen this type of solder in several sources but not the flux or inhibitor.

After soldering the flange, the holes for the deck bolts are drilled with a #72 drill bit. The location for the holes should be punched with a small darning needle to keep the drill bit from "walking". The edges of the flange can be shaped with a flat needle file. The pawl arm is cut and shaped from 1/16" brass and inserted into the stop. The top portion is rough cut and soldered on with a rosin core lead solder and then shaped. Use the inhibitor on the pawl arm if you want to have it work although it's not absolutely necessary. (The pawl engages the whelp as it passes and prevents the capstan barrel from reversing direction and injuring seamen.) After the part is cleaned up, the center bolt hole can be bored to secure the pawl.

As with all iron work on the model this part was sprayed with Pactra's® scale black. This gives a light covering without filling in the details.

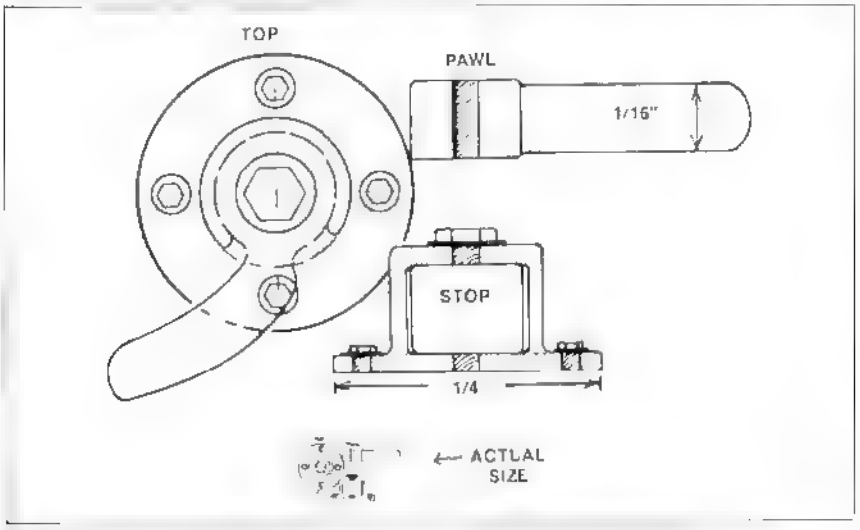


Figure 35

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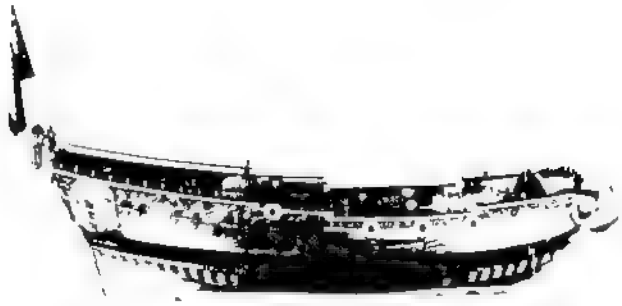


The Quarter Galleries

Constructing the quarter galleries on FUBBS is a delicate job despite their sturdy appearance. The heavy carvings surrounding the windows give this feeling but, with the exception of the four cherubs under the window ledge which serve as a support, the remaining carvings are little more than decoration.

The bay window design seems to be a transition from the older quarter badges to the full blown quarter galleries that followed in larger ships. Inboard on FUBBS the depth of the ledge is just over 12" (30.5cm) and the height about 30" (76.2cm).

The glazed window portion of the gallery rests on a thin slab supported, as I mentioned, by four cherubs. The top overhead is another thin slab, with two seated cherubs holding what appears to be a flag or pennant. Flanking the gallery are two single figures whose backs rest against the side of the hull.

The sketch for the proposed carvings is shown in Figure 36. The two uprights supporting the front of the top on the outboard side are twisted columns.

Carvings on the gallery framing are added later. For this reason the framing is built as a separate unit. This is how they were built on the Greenwich model. There is only one gallery intact. The other suffered damage exposing the underlying construction.

Without some sort of support at the back of the gallery, it would be almost impossible to build. I decided to use some 1/32" (0.79mm) sheet stock as a backing piece. Outboard the top and bottom slabs appear "moulded" so that one edge overhangs the other. Both slabs were made from two pieces of sheet stock glued together. One was made slightly smaller at the front so that when it was glued to its mate it appeared as though the edge was a carved moulding. This is a particularly good way to handle extremely small wood mouldings to preserve the fine edges that almost always get rounded over no matter how light the sanding.

This same technique was used to build up a channel moulding that would be used to hold the panes of glass on the underside of the upper and lower slabs. The various components of the galleries are shown in Figure 37. The glass used was side glass cut to fit between the upper and lower slabs and in the channel. The glass at the sides is set at an angle and therefore the channel must be beveled to allow for this. The front face of the channel can be used as a part of the window frame, top and bottom. They are set back slightly from the edge of the slab. The two side sections

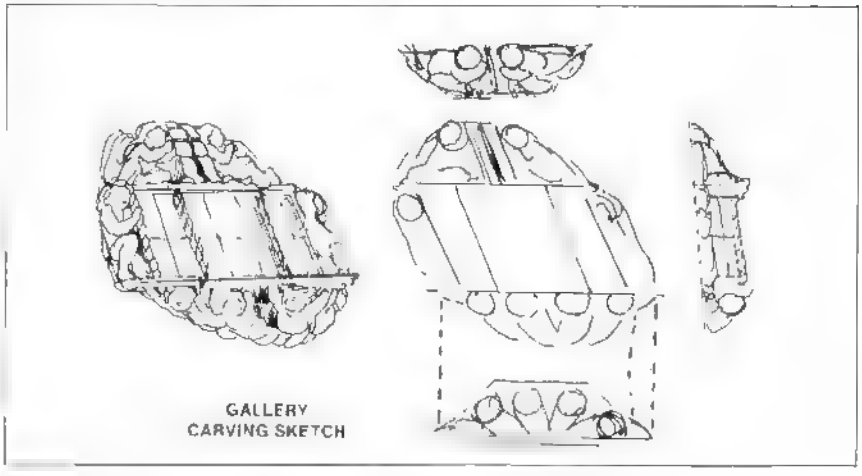


Figure 36

are cut at an angle, following the lines of the slab. The front portion is removed for insertion of the uprights later on. They are cut down to the level of the floor of the channel (Figure 38).

The shape of the backing piece can be taken from Figure 38. It includes all the windows in the diagram. The outline should also be drawn on the side of the hull if you haven't already done so. Two side supports must be cut to hold the glass

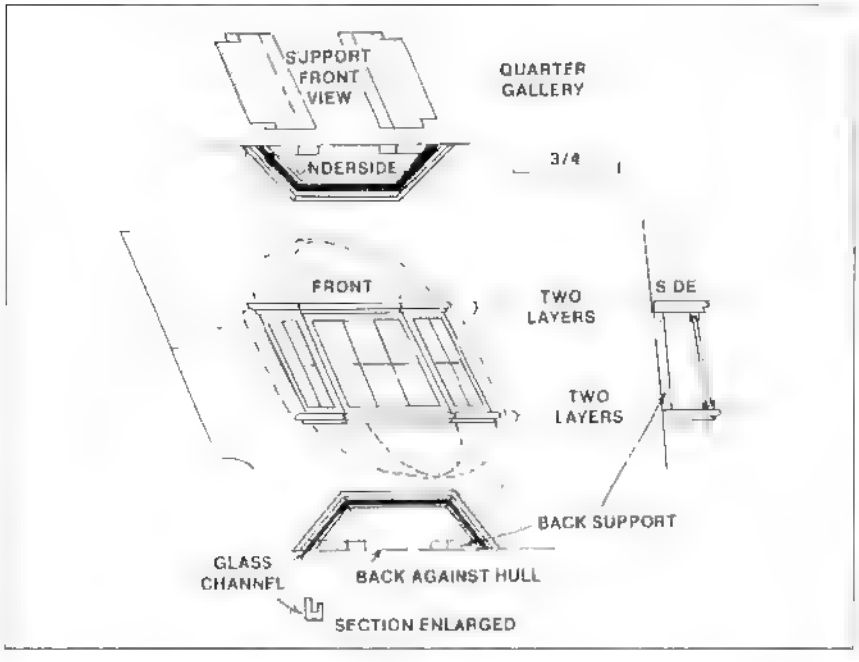


Figure 37

on the inboard side. These have a peculiar shape and, unless you have access to a small lathe with a table saw attachment, it might be a good idea to build them up in layers. Figure 39 shows the top edge cuts required. The dashed line represents the glass. The top and bottom of the glass slips into the channel. Where the glass rests against the side support (A) that edge lines up with the outboard edge of the upper and lower channels. The surface (B) is the top of the support and it touches the underside of the upper slab. The cutout portion just forward of it is where the channel rests. When these are glued into position the lower slab can be glued against the backing piece.

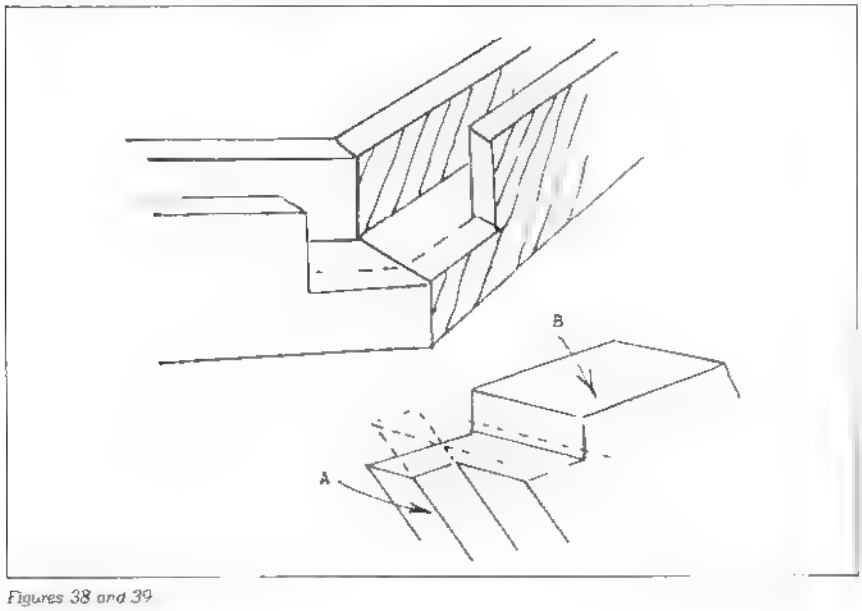
It's at this point that the glass is cut and fitted. Use some scraps of two ply bristol which is about the thickness of slide glass to cut out the pieces. Temporary supports can be cut from scrap for the top slab to rest on while cutting and fitting the glass for the windows. Paper patterns are a help in finding the exact shape of each pane, and will save you more time. It's better to snip more paper than to be cutting glass again. To keep the glass from shifting during the trial period use some wax adhesive (doll house supplies). Photo 15 illustrates the position of the upper and lower slabs fitted on the backing piece. The side supports show the area the glass is fitted against.

Once all the glass has been cut, wash it and set aside until the interior of the gallery has been Val Oiled or varnished. When dry, the glass is installed and the top slab can be glued in position. Some of the leftover moulding cut earlier can be used with the following modifications (Figure 40). Moulding blanks are first cut to the proper angle, top and bottom (A). The moulding is turned over, and on the backside a V groove is filed into it. This is done to "bury" the edges of the glass (B). The upper and lower ends of the moulding was marked for the height of the frame it fits against, then the area between the marks is filed away (C). Next, the front face is scored with a file diagonally to represent the twisted column.

After the uprights are varnished, they are glued into position. Those shown at the sides are carved into the unit with the figure, so you need to make only two uprights for each gallery. The framing is set aside until the carvings are complete and fitted against the hull. These should be one of the last things to be installed prior to rigging the model. By that time, all the heavy work would have been completed and the danger of damaging the galleries passed.

Returning now to the inboard works of FUBBS, I'll pick up where I left off prior to the installation of the floor of the royal cabin. I planned to install the partitions and stairs in the cabin area. Because of the deck camber beneath the floor and the arch of the beams overhead, the partitions would be difficult to install without some kind of groove in the flooring. I used 1/32" half round moulding to create the groove and stained them a dark brown to blend into the flooring. The channel followed the layout shown earlier for the various compartments.

After laying the deck beams, their location was marked on the sides of the cabin so that holding pins could be driven into the beams while the epoxied floor was drying. Although little of the detail would be seen even with some of the deck planks left off the poop deck, I wanted to include the settee and the matching panels at the sides of the cabin. Tracings were made of



Figures 38 and 39

the side walls, then rubber cemented to 1/32" mahogany sheet stock and cut out.

Matching channels were installed where compartments were divided, in line with those on the floor. Contact cement was used to install the panels to the curved side walls of the cabin.

Unlike later years when the inboard walls were planked up, FUBBS' walls were paneled much like the walls of drawing rooms. It's easy to understand why gilded skins were used in the interior. They probably added reflected light from candles and sunlight coming through the lights at the transom to brighten the interior, and relieve some of the somber quality of the dark woodwork.

Before the partitions are installed, the settee and stairs must be constructed and installed (Figure 41). The back edge of the seat and back of the settee follow the curve of the inboard side of the counter, while the front edges of these sections follow the athwartship camber of the deck. The side arms and back support also follow the curve of the counter at the back edge.

To construct the seat and back rest, I used two lengths of triangular shaped pine faced with mahogany. The seat was shaped first and only the front side was faced with the veneer because both the seat and the back would be covered with velvet. The back only needed shaping on the back side. The side arms were cut from1/32" mahogany sheet stock following the shape of a paper pattern. The stock was sanded prior to cutting to preserve the delicate ends of the arm pieces, leaving only the upper edge to sand lightly to remove the sharp edges of the stock.

Once the arms were glued on, the seat and back were covered with short napped velvet ribbon. The edge of the ribbon was brought down over the front of the seat about 1/16" which gives the illusion of a soft cushion. Between the back edge of the settee and the windows of the transom there is an unfinished area that was covered with a mahogany board with a hole bored for the rudder post that passes through to the deck above. Its forward edge acts as a finish moulding for the settee (Photo 16).

The simple staircase shown in Figure 41 is made from three lengths of 3/16" stock glued together. When dry, the curved sides were sanded and then the bottom was sanded to fit the curve of the deck. The sides and the treads are covered with 1/64" thick mahogany. The simple railing is made from brass rod and wire for the hand rail.

As I was preparing the poop deck beams for installation it occurred to me that it would be a good idea to finish the break between the quarterdeck and the poop since it consists entirely of windows and a glass paned door. I soon realized it would be impossible to build it otherwise. It simply had to be made as a separate unit.

Meanwhile, I set about fitting the deck beams for the poop deck (Plate One). Final installation would have to wait until the partitions were cut and installed in the cabin. The partitions dividing the side cabins and those at the ends gave the most trouble because their bottom, top, and side edges all curved due to the deck beams and the curved sides of the hull. Several cardboard patterns were cut before I got them right — all the while I was asking myself why was I doing this!

I found the best method was to get the side curve right first, then the floor, and finally the deck beam overhead. A little side pressure against the deck beam left enough of an impression to mark the curve.

After the patterns were right tracings were made and rubber cemented to sheet stock and cut out. The long inner walls were much easier to do. Thin gold foil was used to represent the gilded skins on panels down the length of the walls. I'd hoped these would help light up the interior as they had in the original vessel.

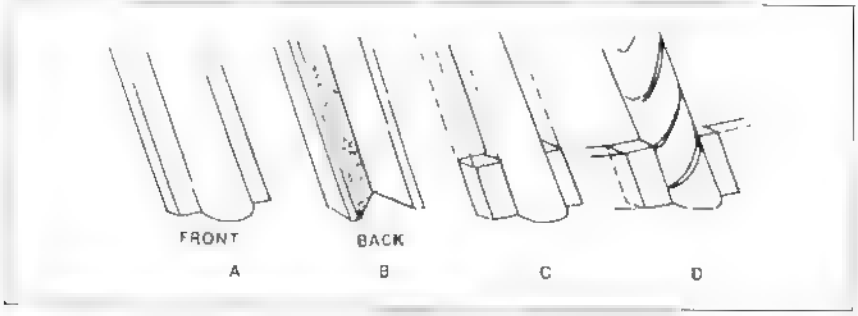


Figure 40

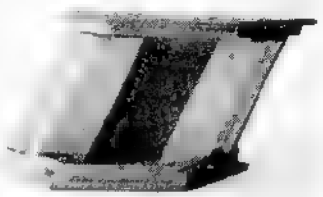


Photo 15. The quarter gallery for the starboard side. The dark portion in the center is the backing piece and this area will be cut away before the glass is inserted and the top secured.

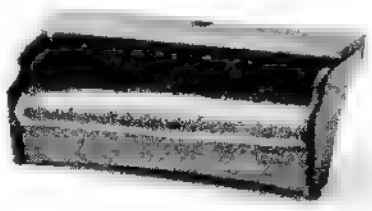


Photo 16. The completed settee. Note the loose cover for the counter and the hole for the rudder.

Photos by Gary Lilien

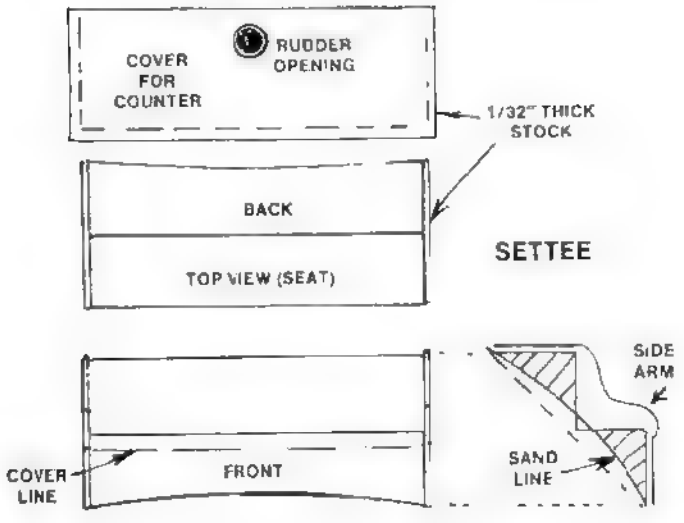
BREAK IN THE DECKS

The glassed-in break of the quarterdeck is a complicated system of windows, beams, and arched doorway leading to the royal cabin (Figure 42). I used a combination of units to build it. The cross-section shown in Figure 43 shows how easily you could paint yourself into a corner. The unit rests on top of the quarterdeck planks that would have to run the full width of the beam for support of the window framing.

Above, the moulded cross beam becomes the deck beam of the poop level with its after edge routed out to receive the deck planks there. Both the uprights between the windows and the upper and lower sills are grooved to make a channel to receive the panes of glass. The frame surrounding the panes is recessed and rests against this channel.

Both the top and bottom cross-beam have a small bead on the fore edge. Both of these beams were made a little wider than the rest to accommodate using a moulding cutter to form the beads. I had decided on using apple wood for the deck planking because the lighter woods were too great in contrast to the rest of the model. I mention this now because whatever planking you decide on will have to be used in that stacked upper bead section (B, if you don't use a cutter. This piece doubles as the margin plank running athwartship, with the poop deck planking butting against it.

While the glue on the lower cross-beam and uprights was drying, I began work on the sides of the door mouldings. The arched portion of the door was turned on the lathe and the recess for the glass included. The straight portion of the moulding would be notched to fit around the crossbrace of the door. This crossbrace is actually a part of the cross-beam with



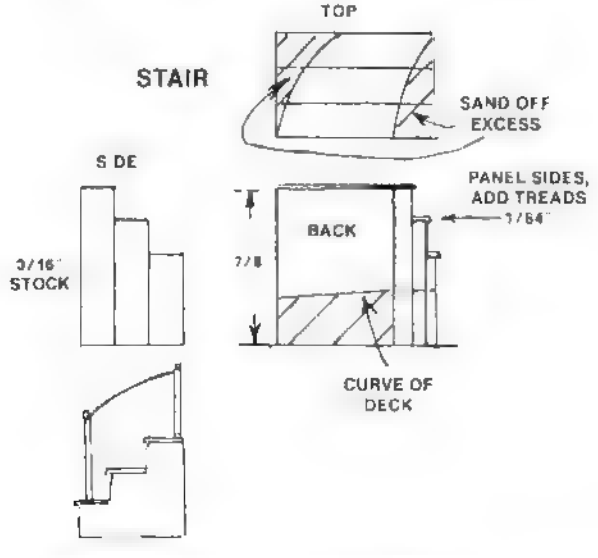


Figure 41

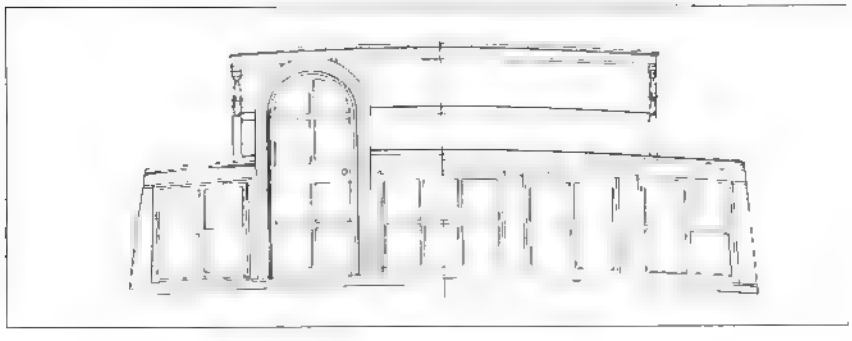


Figure 42

the fore side filed away. The straight section of moulding was formed using two 1/32" thick strips glued together with the inner strip set back 1/64". The channel section for the glass was made from 1/16" thick stock, with a shallow groove cut into it. The edges were then sanded down to about 1/64" thickness. The window munnions are 1/32" by 1/64", and you'll need about 20" plus extra for breakage.

After cutting the glass pieces for the windows, they were inserted into their grooves and the top cross beam was glued on and held with rubber bands to cushion the edges and to assure a tight bond.

While turning the arched portion of the door on the lathe, I also provided for a recess on the back side to "bury" the fore edge of the hood which rests on the gallery on the poop deck. The completed framed window section is shown in Photo 17.

POOP DECK HOOD AND GALLERY

Having gone this far I decided to continue on and finish the hooded gallery of the poop deck. I made a wooden plug to shape the hood from a length of wooden dowel cut in half. Thin copper shim was used for the hood. It was heated to soften it and make forming it over the wooden plug easier (Figure 44). After forming the hood section, I cut a rim from heavier sheet copper and soldered it to the flange of the hood. On top of the rim, a bead was added using a 1/32" section of square brass rod with one edge rounded

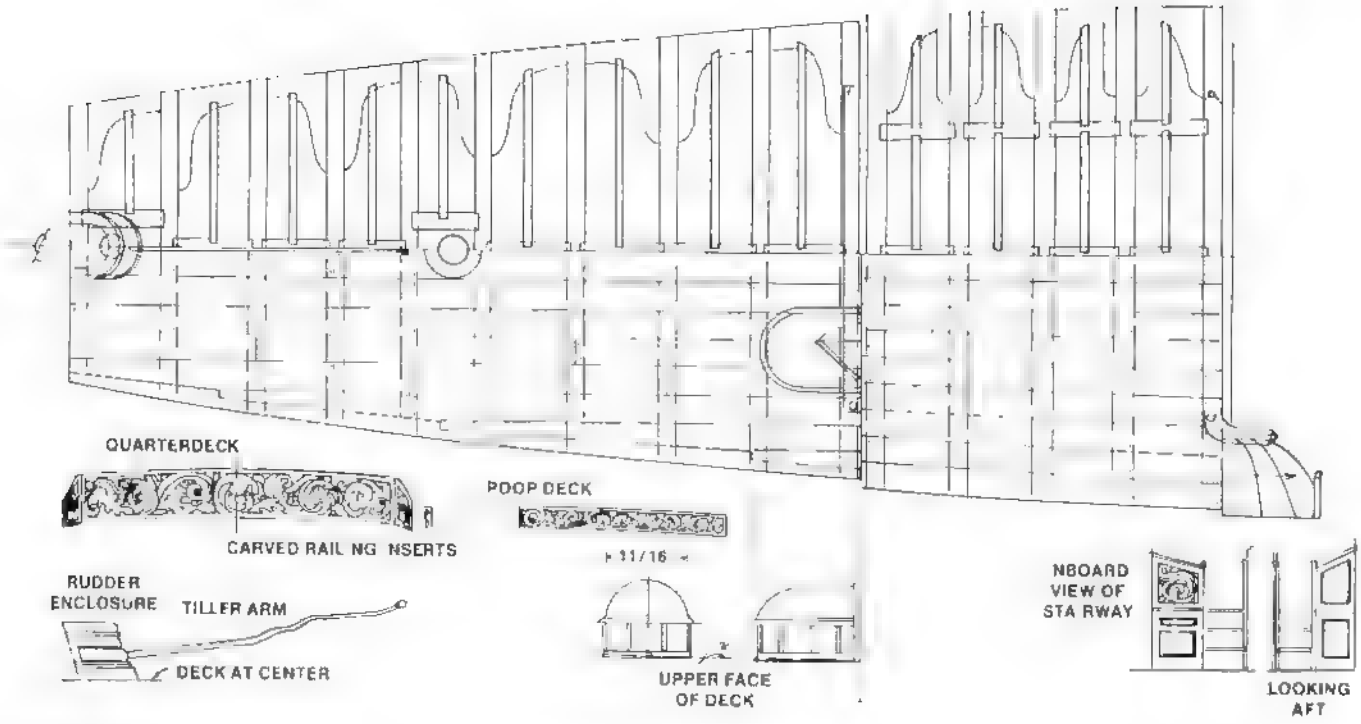


Plate One

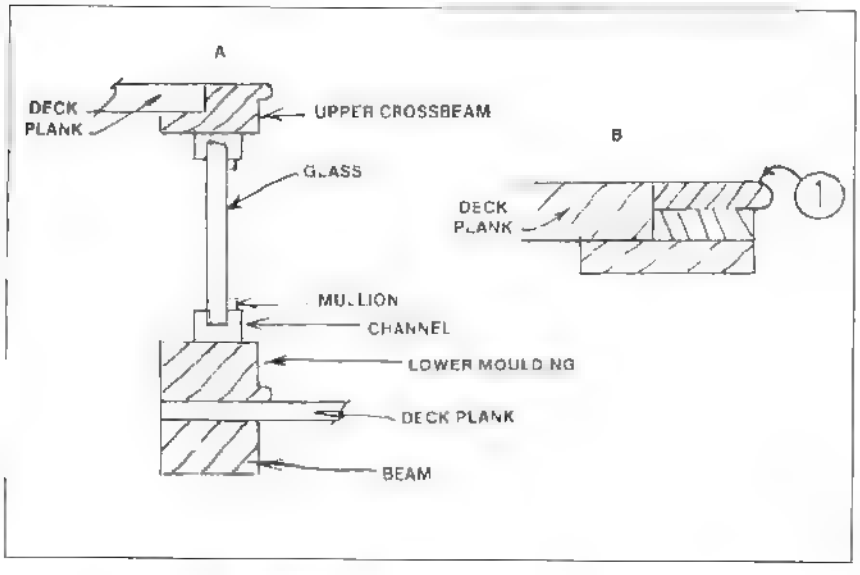


Figure 43

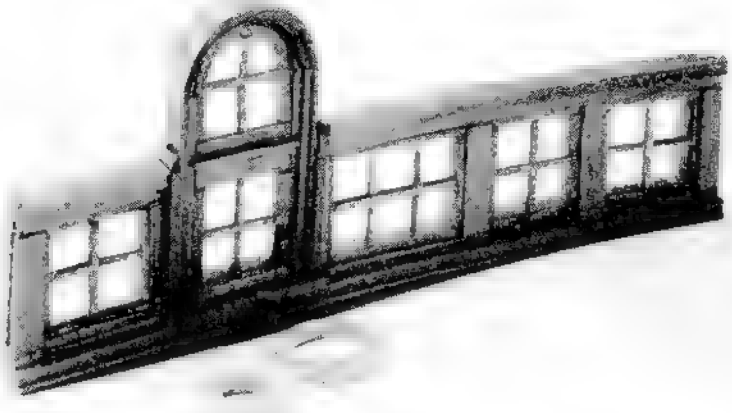


Photo 17 The completed break at the quarterdeck. The lower edge follows the deck camber, but the shadow cast below it makes this a little difficult to see. In front are the turned mast coats for the royal cabin and poop deck. *Photo by Gary Lillien*

The gallery portion was built up in sections made up of straight and curved strips of apple wood. The most difficult and frustrating part was solving the curved glass section on the inner side of the gallery. The solution was to use a cut off section from a test tube and then to grind down one side so that I had a semi-circular section that just fit the inner curved section of the gallery. The straight sides were cut from slide glass secured with half-round sections glued to the ceiling of the gallery. This is made from 1/64" thick sheet stock glued on top of the framing. On this rests the hood that was epoxied to the ceiling after the gold leaf was set (Photo 18).

With all of this behind me, I could proceed to install the cabin partitions, stairs, and small settee at the stern.

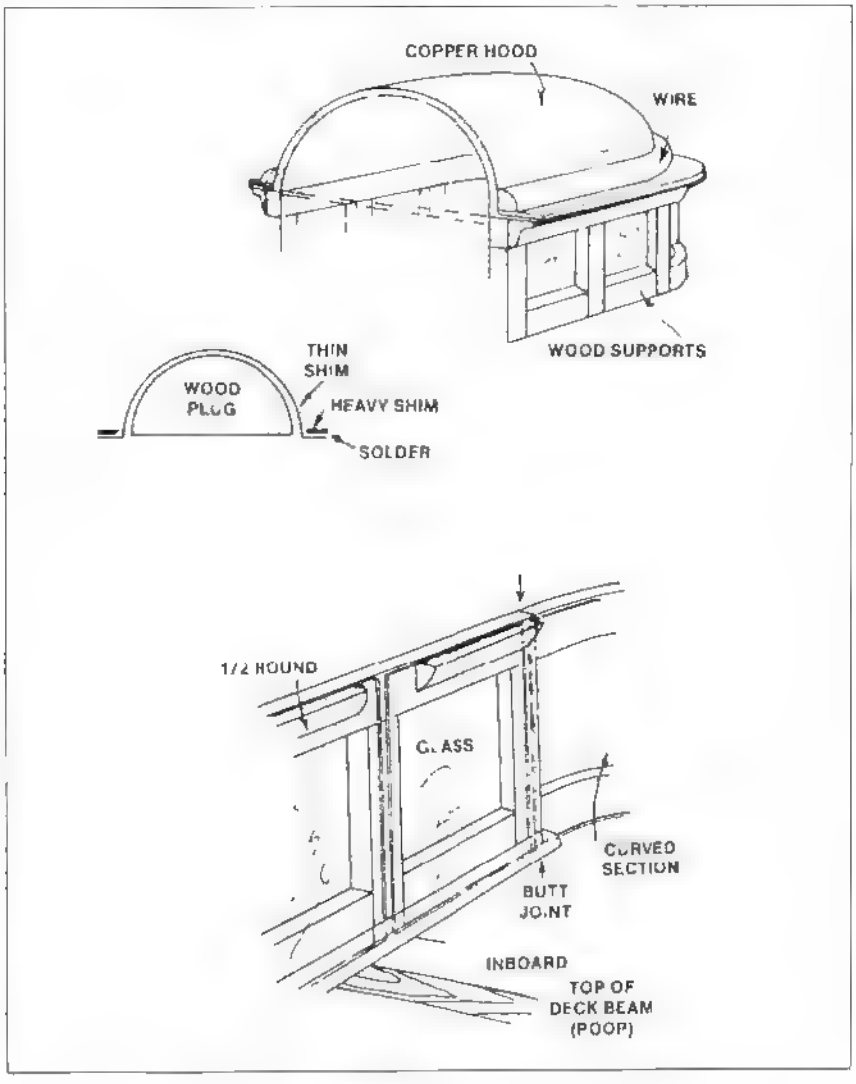


Figure 44

Photo 18. The completed hood gallery and the wooden plug used to shape the hood. The next step will be to give the hood a coat of red clay, size it and lay the gold leaf.

Photo by Gary Lilliett

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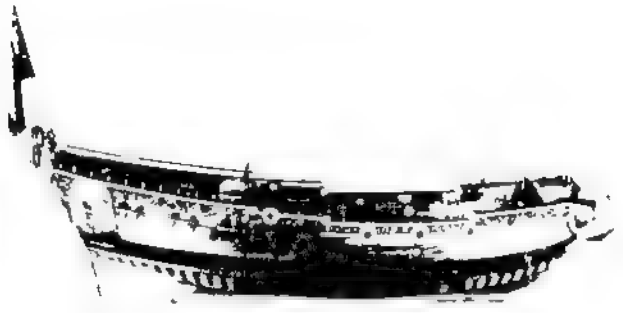


Completing The Carvings

As work progressed on the stern carvings for FUBBS, the nagging question of the figurehead configuration returned unanswered. I was beginning to understand what L.G. Carr Laughton meant by the baroque being "art with knobs on." He tells us that whenever the establishment reduced carved work in one direction, the carvers took the opportunity to add it to another.

At first it appeared as though they had added it all to the stern of the FUBBS without restraint, leaving me to wonder how much could possibly be crowded onto the surface area of the figure block at the stem.

The photographs of the Greenwich model were both taken from the stern quarter giving only a hint of what might appear on the figurehead. Clearly, more definitive information would be required if that area was to be done properly. Among the research material I had gathered for the FUBBS model was an article written for *Model Shipwright* by Donald McNarry on the rigging of Stuart royal yachts. This article triggered the thought that I might find what I was looking for in one of McNarry's books. The re-issue of Donald McNarry's first book, *Ship building in Miniature* did carry a piece on the FUBBS, but the photographs of the model were disappointing. Although it was taken from the bow, it was entirely in shadow, and even if it had not been, the area was so small that any detail would

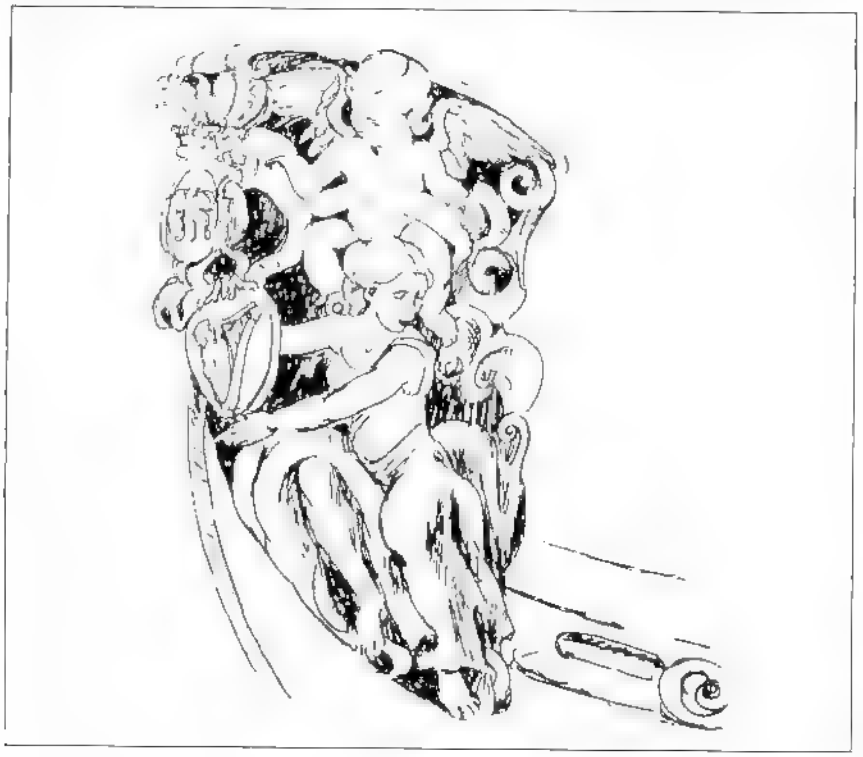


Figure 43

surely have been lost.

It was then that I resolved to write to McNarry directly and to put the problem of the figurehead to him in the hope that he could clarify it for me. Over the years we have corresponded when in search of an answer to some knotty problem, but I always hesitate since he, as so many busy modelers, have little spare time, and still less for writing letters. To my delight, he responded quickly with color pictures of his model and those he had taken of the one at Greenwich.

As could be expected, the figurehead was a massive carving. Flanking the fore edge of the stem were seated figures holding a shield bearing the Irish harp. Above them were crouching angels with ribbons draped over their laps. Their outstretched arms supported a tablet bearing the initials GR, and above this a four arched crown (Figure 45). Capping all this is a triangular piece with indistinct carvings on the upper side, just under the bowsprit, which protects the lower carvings from damage and might also serve to prevent the lines from fouling in the projected carvings. This excess of detail may look very well on paper but when viewed from a distance much of it would be lost, especially if it were gilded, which would give the appearance of the "knobs" spoken of earlier.

When faced with the problem of multiple figures in one area, the modeler often chooses to carve the figures separately, and then assemble them at the point of contact on themodel. I confess the idea crossed my mind as well, but the difficulty with this approach is that the end product has a look of being made up of parts rather than a self-contained whole. The figurehead will be about 1½" high overall, small work, no matter how it's done.

However, after working on the multiple group of figures which crown the stem I have decided to carve the figurehead in three sections: the two sides and the front with a small wedge at the top to join the port and starboard sides. The shield which carries the initials GR and the crown are touched by the outstretched arm of the crouching cherub can be carved in "the round" without losing the feeling of being carved in one piece. The wings of the cherub which support the top extend to the back of the crown. Carving this section separately will allow you to get in and behind this figure and the seated one below.

Undercutting is an essential part of creating the illusion of depth. Undercuts can create lines and rounds that are only half their real dimension, so it's important to provide for this when planning your carvings. The overall depth of the wood slab used for the stern carving is only 3/16" thick. This is hardly thick enough to carve a full figure even at small scale. Therefore, the undercutting will be extremely important if you are to make your figures believable. A careful outline tracing of the area to be carved is a must. Those portions of the carving that recede should be shaded in as a guide during the carving process. Once the outline has been transferred to the wood stock, the shading can be added as a reminder to you as you work.

Ideally, the grain of wood should run up and down. However, at the stern, the back of the carving will be curved to fit the transom, thereby increasing the likelihood of the wood splitting. For this reason the carving block or slab has the grain running athwartship. All the cutting tools must then cut constantly against the grain — and this tends to dull them quickly. How such a carving progresses can be seen in Photo 19. For me it was more comfortable to work from right to left so the figure at the far right is the most complete. You'll find as you work you will have to move on to the next figure before completing the one you are working on because of the overlapping portions in this group.

Carving begins with an outline cut made with a thin blade. I used a #11 X-Acto blade at first, then switched to a Swain Morton® scalpel knife with a #10A blade. It had less tendency to bend the fibers because it was about half the thickness of the X-Acto blade. The outline cut is followed by a slight wedge cut, which gives definition to the figure. The next step is to remove some of the background material with a rotary burr.

I was able to obtain very small headed burrs from Anchor Tools®. The heads of these burrs about 1/32" in diameter and can get into some of the small areas with ease. You can follow up with larger heads in the broader areas if needed. Once the background areas have been cleared, you can begin to work on the recessed portions, and some of the undercutting. Both a strong concentrated light such as a high intensity light and a magnifying glass are helpful to determine how much material needs to be removed.

Another essential set of tools are fine carving tools with narrow shanks and cutting edges 1/16" wide. Too, houses specializing in miniature tools carry these and the prices range from very inexpensive to a king's ransom. Years ago the Harmin® firm sent me a set that has far outlasted its moderate price, but I'm not sure they are still in business.

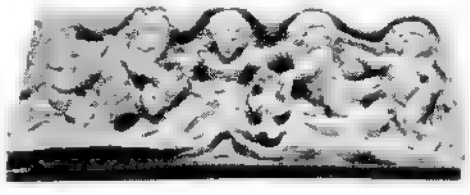


Photo 19. Note the progression of the carving from right to left. The first figure is nearly complete, the second has most of the finished carving done, and the central one has been roughed in.

Photo 20. These are the completed and gilded figures that go between the windows at the stern.
Photos by Gary Lillien

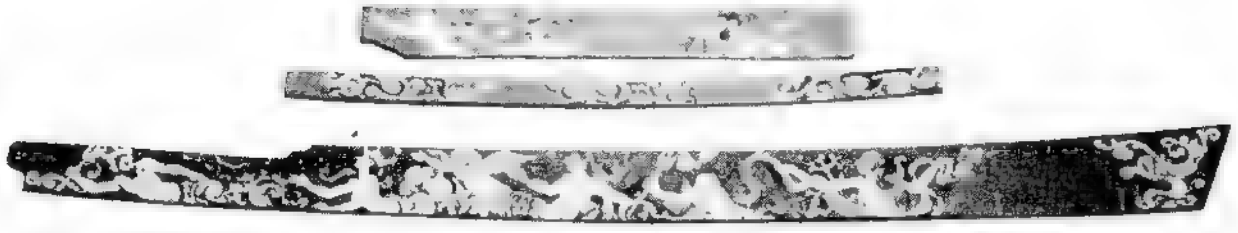


Photo 21 Three sections of the frieze for the starboard side. The bottom one has a blank area on the right. This will be covered by the carving over the quarter gallery. The middle section goes at the waist. The blank areas here are for the port openings. The top piece will reach as far as the cathead with one blank area for a port. *Photo by Gary Lillien*

The "V" parting tool and gouge are the most useful for the longer cuts that are required. Anchor Tool also carries miniature fine bent rifflers that are used in lieu of sandpaper to smooth surfaces. A final burnishing is done with a hardwood stick that has its end pointed and rounded smooth to prevent marring the surface.

Individual carvings between the windows at the stern were carved from a strip 1/8" thick. The small figures are carved on a small tablet the width of the space between the windows. After tracing off the outlines the excess wood is removed from around the perimeter of the tablet. The outline of the figure is cut and then the excess wood on the tablet portion is cleared. Doing these small figures one at a time from a continuous strip of wood gives you something to hold onto as you work. These carvings must be very shallow, otherwise the overhang on the lower edge will go beyond the counter moulding. Again undercutting is the key to making them look deeper.

Because detail will be lost when the carvings are gilded, some areas will need to be exaggerated. Eyes and mouths should be bored with a fine drill bit to give them extra depth. Lined areas should be given an extra deep wedge cut to keep them from disappearing under the gold leaf. This is not as much of a concern in the broader carvings above and at the sides of the stern, yet, you'll want to keep in mind that at least 20% will be lost once the piece is gilded. You'll get the feeling of how to proceed if you begin with these small carvings and work toward the center of the figure. By the time you've completed the four small figures you'll have established a working method that will allow you to go on to the larger unit with confidence (Photo 20).

McNarry's photos revealed considerable information not gleaned from the black and white photos from Greenwich. The fact that they were in color had a lot to do with it and short of seeing the actual model, this was the next best thing. The color gave me demarcation lines that were not there in black and white. The first surprise was the railing at the quarterdeck. Below the railing is a solid portion that I had interpreted as a carved area but in fact was a colored frieze painted with scrolls against a medium blue background. I'm now glad I had not decided to carve that section first!

The second surprise was not as pleasant. In the previous chapter there is a photograph of the glazed main break of the poop deck showing the entry way to the royal cabin at the left of the row of windows on the starboard side of the hull. I had questions in my own mind about its location when the photos and plans arrived from National Maritime Museum. The reason for this was because the photos showed a slightly askew part that was the base for the hood behind the arched doorway, on the port side of the model. The plans, however, were in reverse with the doorway on the starboard side.

My thinking at the time was that the plans represented the vessel as she appeared in 1724 and that the position might have been altered at that time. My plans for the vessel were drawn accordingly and I thought no more about it, until Donald McNarry's photo of his model and the Greenwich model arrived. To my surprise, McNarry's model has that entry way to PORT.

Correcting plans is simple — but to rebuild that complicated section over again was something I was not looking forward to. I couldn't imagine that the blueprint room at Greenwich had printed the plans backwards — but then no one is perfect, and that could have been the case. I returned to the plans and found they had been copied correctly. I could be sure because the prints had been made on photostat paper that had to have been made from a photostatic negative. These are opque so the possibility of accidently reversing the negative couldn't happen without an extra step between the negative and the positive. Why then did the McNarry model show the entry on the port side? That's a question that still has to be asked, but I suspect it was because he relied on the Greenwich model.

A closer look at both the Greenwich photos and those sent by McNarry give another possible solution. The poor fit and loose appearance of the hood section on the Greenwich model indicates to me that this is not its original location. In addition, the wood on the starboard side where it might have originally been is lighter in color both in the Greenwich photo and the color shots sent by McNarry. This might indicate that it had, at some time, been covered and thereby protected from the age darkening of the rest of the deck planking.

During the war these models were hidden away with the rest of Britain's treasures in various locations throughout the commonwealth. McNarry was describing just such a condition of a model of the SOVEREIGN at the Leningrad museum. It had been buried during the war and, when resurrected, had lost some of its elaborate carvings. He had been searching out this beautiful model for more than 30 years and had just recently gotten someone from the British embassy to photograph it for him.

I had seen a model ten years ago when I was in Leningrad and it was this model which began my correspondance with Donald McNarry. He has now begun to build her in miniature, putting aside, for me, any complaints over the difficulty of the carvings for FUBBS.

As an alternate work session, I began the painting of the frieze which lies just below the cap rails. The McNarry photographs show that the frieze continues across the bow section and over the rudder at the counter. Neither position could be seen in the photographs from Greenwich. I was pleased to see that I had presumed correctly that the background color was blue. I wanted to use a water based acrylic paint and after some searching, found the perfect ground color. It is made by Tamiya®, number XF-8 (blue). Three very thin coats are the base with light sanding between, done with the fine finishing film medium grit — and — a gentle hand. Too vigorous a sanding will remove all the paint. The result is a delicate eggshell finish.

To transfer the design to the prepared wood I used white saral transfer paper. This is a white carbon. A 4-H pencil, kept well sharpened will give you a fine clean line. The figures were painted in with opaque designer colors made by Winsor

Newton. Enough of the blue shows through to keep the figures appearing as though they were under water. As you can see from the photograph (Photo 21) the three sections break at the waist area on the hull. This is the least obvious place and will make final installation simple.

The only difficult spot is at the bows where there is considerable curvature close to the cathead and supporter. To overcome this, the wood used for the base of the frieze has been sanded paper thin and feathered back some distance towards the waist. The foreside of the cathead can be applied as a separate unit, now that I know it, too, is painted.

McNarry added two barrel shaped seats of ease which also have a continuation of the frieze. These are tucked up close to the upper rail at the level of the sheer rail on the Greenwich model. Because this rail is missing, it is more easily seen. The lower edge of the seat has a distinct curve. The top is varnished clear wood. Also revealed in this same photo is the bolster for the hawse holes. It, too, follows the curve of the lower rail. The bolster fills the space between the upper edge of the main wale and the sheer rail above.

The black color of the main wale is continued below the figurehead carving at the stem. None of the carvings are gilded, by the way, all of them are varnished clear wood. McNarry tells me that this is typical for dockyard styled models without spars and rigging.

The gammoning knee and gammoning slot are also seen. The slot is cut through a simple carving of scrolls on the trailboard. The apron also has a continuation of the frieze and the area above this is painted black as are the rails.

Another question in my mind was the carved area just above the windows in the quarter gallery. Here again, McNarry had the answer. He explains that the object held by the two cherubs are the Arms of D'Aubigny (the name of the estate owned by Charles II's mistress, Louise de Kerouaille) the FUBBS' family as he calls it. The arms consist of a tablet (red) with three gold straps and buckles.

Apparently at the time it was built, FUBBS royal cabin was built with bulkheads running athwartship, separating the cabin into three sections. The foremost one has a diamond pattern on the deck, the middle some type of carpet and the third completely blocks the stern windows. The walls and partitions are a light blue with gold mouldings and decorations. The later Greenwich plans indicate a central hallway running down the length of the cabin.

A paint line across the inboard face of the transom at the height of the cap rail was an indication that something ran athwartship at that point. On his model, McNarry has a grating running across the transom and I assume it probably is correct. It extends forward to the after side of the lower sill of the quarter gallery and it is framed on all four sides. The steering mechanism lies below this grating and it would seem an appropriate fitting to prevent rigging lines from fouling the gear below.

The Greenwich model still has the central lantern bracket and the location holes for those at the sides, confirming the fact that FUBBS did carry three of these lanterns.

The value of these photographs is beyond measure and they will continue to help through other building phases and later on the rigging of this model. They certainly point up the importance of good visual material if seeing the actual model is out of the question for one reason or another. In this instance, Donald McNarry's photographs and helpful comments will have assisted not only me but those of you who will be building this model sometime in the future.

9

Breaks At The Quarterdeck And Poop

I had very nearly painted myself into a corner by not beginning with the main deck and working aft. Fortunately, I had not yet installed the poop deck beams, although it would not have been a disaster if I had. The problem lies in connecting the quarter deck and the poop.

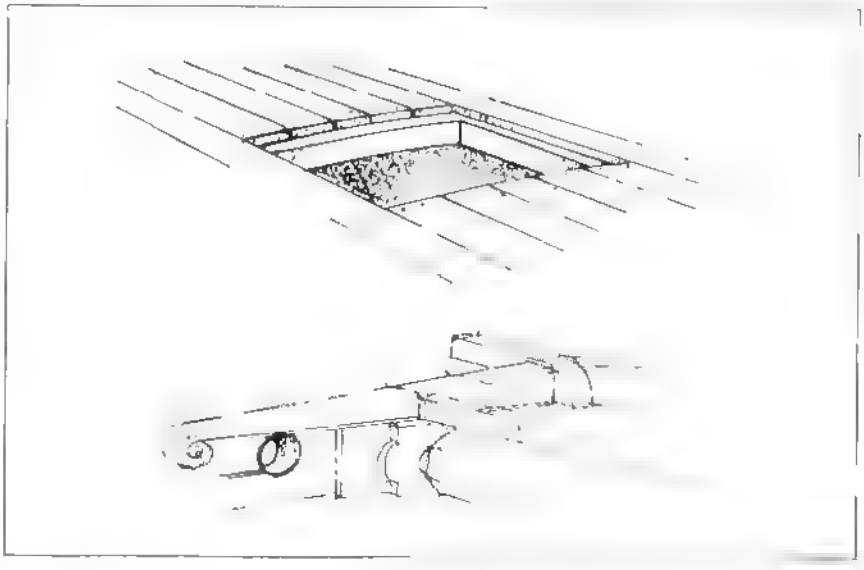
Once again, the McNarry photographs proved invaluable. Neither the Greenwich model photographs nor the plans give a clue as to what goes on at the break of the quarterdeck, but McNarry's photos did. Not only is there overhang, but there is enough of it to require support pillars under the beam supporting the quarterdeck planking. What appears as paneled mouldings at the break are in reality window lights. I had thought that those quarters below the quarterdeck must have been terribly dark and indeed they would have been without the window lights.

Starting, then, with laying the planks on the main deck brought me face to face with the decision to plank the deck with applewood. I made that choice and am now glad that I did. The planks were laid 1/16" shy of the openings for the hatches so that they could be dropped in later (Figure 46). Up in the bows, just below the rail, are gratings which need support at the sides and on each side of the entrance for the bowsprit. These are more easily installed now than they would be later on.

Next were the linings of the bulwarks which are done in two stages. The inner layer up against the frames was mounted as one continuous strip up to the support for the windlass. Above the support there is a narrow wedge which runs up to and against the side of the cathead inboard (Figure 47). The heavy beam over the windlass interrupts this lining where its upper surface is flush with the underside of the rail. The bows take a very quick turn forward of the windlass support. Since this area is not seen below the grating, you may want to leave off the short section of planking that would be required here. Not only does it take a quick turn fore and aft but the sides also become convex. It's an impossible planking job unless very narrow strips are used.

The inner layer of bulwark planking was also put in using a single strip of 3/64" thick apple wood. The holes for the gun ports just cut into the strip slightly. Paper patterns for both the inner and outer bulwark linings are a must. The deck sweeps in a gentle curve fore and aft, then moves rather sharply at the bow portion. Each of the port openings have their openings reinforced by circular surrounds, although McNarry kept them square as in the original model. I followed suit and did the same. It seemed to make more sense to me.

Figures 46 and 47



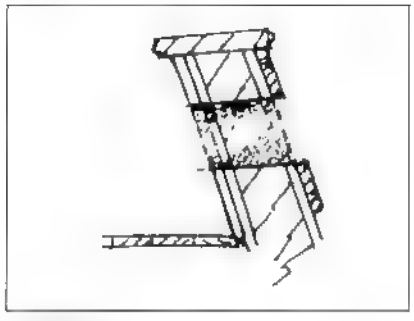


Figure 48

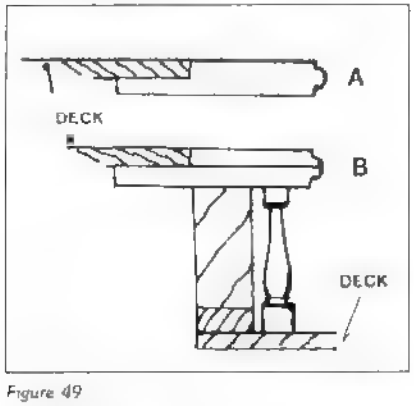


Figure 49

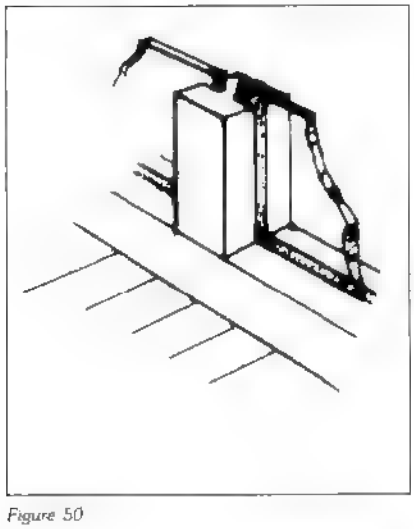


Figure 50

The port openings outboard provide a reference point for drilling a pilot hole through the surround inboard. It's a good idea to start with a 1/8" drill bit and then enlarge the openings with a round needle file held at an angle so that the inboard side will be in the proper location. You'll see when you get to this stage that the hole is higher inboard (Figure 48). On the Greenwich model, the port linings and the areas between the ports inboard are a light red. This touch of color inboard is a nice relief from the otherwise somber look of the seasoned apple wood. Leaving the bulwarks for the time being, we can go to the opposite end of the deck where the break occurs at the quarterdeck.

Here, as with the break at the poop, a wider beam is necessary as a support for the bulkhead under the main deck, and a second wide beam overhead as a support for the deck planks of the quarter deck. Because this beam shows its outboard edge is beaded to relieve the heavy look it would otherwise have.

This beam also serves as a margin plank for the deck planks, so you have the option of routing out the after edge of the beam to receive the ends of the planks. Or, make it the width of the margin plank and to provide for the plank landings by increasing the width of the top brace of the bulkhead (Figure 49). The margin plank should not be thicker than 1/16" which leaves very little support for the planks which are 3/64" thick. The easier route is to increase the width of the top brace of the bulkhead as in (B) of Figure 49.

Both the top and bottom braces and uprights were grooved to receive slide glass for the panes (Figure 50). Shaping a long strip of apple wood grooved on opposite edges was done on the Unimat® table saw. The required lengths could then be cut off as needed and glued into position. The lower brace needed the round up of the deck worked into its lower edge and of course, the upper brace had its upper edge curved to conform with the round of the quarterdeck.

Glass for the windowpanes was cover glass which is almost half the thickness of slide glass and fits less snugly. I decided to try it because I found one of the panes broken in the poop deck's doorway. This might have been due to my moving to a new home or possibly the expansion from temperature changes between the Cape during winter and the warm surroundings the model had been in while in New York. Although the cover glass is thinner, it is also easier to cut to shape. A pair of end nippers could be used to nip off the unwanted portions without shattering the whole piece. It fits into the slot made by the Unimat's fine tooth blade with some room to spare, allowing for the expansion factor.

I left the outer ends of the construction from the last window to the bulwark open, and cut the lower brace at that point to allow the stairs on either side to slide into the opening (Figure 51).

Building the stair assembly was the next item to complete before I could move onto the quarterdeck and install its beams. In the interest of preserving one's lungs I highly recommend Gene Larson's wonderful thickness sander (available from Model Ship Marina). It's vacuum attachment is the greatest invention since the wheel for providing some safety in our dust laden environment. With it, I was able to get the stair treads down to 1/64" thickness with no problem. The stairs were built up in layers (Figure 52). The risers were cut from 1/8" thick apple in graduated lengths. The front edges were curved as shown on the plans, then a strip of the thin treads was cut slightly longer to provide some overhang, and then glued on top of the risers. The front edge was then sanded to the established curve and finished off with a touch of the file. Once each of the stair parts was completed they were glued together and set aside to dry while the bannisters were constructed.

Some of the material left over from the stair treads was used for the mouldings that surround the stairwell supports and bannisters. The inboard sections have to be cut to fit under the margin plank overhang at the after end while the fore edge must be cut so that it will meet the curved portion of the lower railing at the front of the quarterdeck (Photo 22). These small panels were cut from 3/64" decking material. Once the mouldings were applied, a full 1/16" landing was provided for the seat of the bannister. Installation of these parts would have to wait until after the quarterdeck was on, but the stairs and bulkhead could be glued into position under the beam or margin plank.

Both the poop and quarterdeck narrow at the after ends and the deck planking has to be slightly tapered to accommodate this factor. If you plan to completely cover over all the decks caulking at the seams should be done. On mine I used black photographic paper between all the planks, even those used on the poop deck. However since I planned to leave two open areas so that the details below could be viewed, the planks with exposed edges were left blank.

On the main deck, the planks run straight fore and aft, without a margin plank and no nibbed planks. McNarry makes an interesting comment on building a replica of an existing model, and that is to follow the example of the original builder. I have done this, to some extent, in the use of single sheets instead of planking at the bulwarks. But frankly, since both the main and quarterdeck were planked in the usual fashion, I thought laying in a solid sheet of wood for the poop deck would definitely not look right. Had this been a model of HMS as originally built, I think I'd have followed his advice. These small vessels had their planking laid following the sides of the ship and, since upper riders were not carried to the upper there, there is no need to notch in the planks on the side. I'll expand on this later.

The sides of the bulwarks at the quarterdeck followed the same pattern as that of the main deck. Those at the poop do not have that extra reinforcement below the rail. As you'll see, the cap rail is topped with a rough tree rail which compensates for the extremely low bulwark at the poop. If you've provided packing pieces between the top timbers, they will provide a secure landing for both the bulwark and the gold leafed moulding on the outboard side, above the painted frieze. But this is getting a little ahead of myself.

The interior of the royal cabin must be completed now before the deck beams are installed, and the rudderpost must be

fitted into the opening at the back of the small settee in the cabin. I chose to build up my rudder blade so all I needed to do was to get the post fitting properly. If yours is made in one piece, it'll have to be finished at least as far as that post. If you remember, there was a thin covering board at the back of the settee through which the post passes on its way to the deck above.

Once this is fitted, the panels for the cabin partitions can be installed. Since this is rather fiddling work, you might want to do all the fitting first, then glue in the stairs, settee, and finally the panels. The height of the panels is governed by the curve of the deck beams for the poop deck. As long as the deck clamps in, place the deck beams over the partitions to be sure that they will clear. On my model, this work was done months ago, and so it was a simple job of assembly.

The one thing to watch is the installation of the lower bulwark on the quarterdeck. These can't go in until the break for the poop is installed, since they must notch over the moulding at the base on the deck. After laying the beams and cutting the deck planks, everything was set aside until I made the turned posts and railing here and at the quarterdeck.

Both the Greenwich model and McNarry's had ivory turned posts including those used on the rough treera... The railings were painted black. I wondered if the contrast might seem too great, but decided to try it on one pair since little would be lost if I wasn't pleased with the effect. Ivory, by the way, is pretty heady stuff to breathe. A mask is a good idea when turning or sanding it. It's quite brittle, so go at it in stages and allow it to cool between steps. Wetting it down helps to prevent it from shattering and reduces dust. For a fine polish, I cut thin strips of the "fine finishing film" and lightly went over the finished turnings. I'm not convinced that I like the bright look of the turnings, but there's still time to change them before they will be permanently installed.

My main concern at that moment was to get as much of the cutting and heavy sanding out of the way so that the model, with all its open areas, would not be subjected to further dust that would cling to the glass. Installing the break at the quarterdeck and poop still had to be done. What dust couldn't be blown out through the open hull or vacuumed up would just have to stay. A final sanding of the deck planks would have to be done with one hand on the vacuum cleaner and the other on the glue pot.

Planking the main and quarterdecks is pretty straightforward. Those of the poop differ in that they taper to about half their width at the taffrail and they are laid directly over the beams without the support of the ledges and carlings. This feature was evident in the Greenwich model and McNarry's. That portion of the deck which lies under the hooded stairwell needs to be exposed so that light from below will show through the doorway at the break of the deck.

The best way to do this is to reduce the planks that the gallery under the hood rest on to about 1/8" wide at their outer edges. Normally the hood would cover three of the planks. Without the support of the ledges and carlings, there was almost nothing to support the short plank lengths. At the after end of the planks there is a half-round indentation to reveal the area below so only about 3/8" of planking actually shows.

I found the best solution to this very iffy construction was to cut the supporting

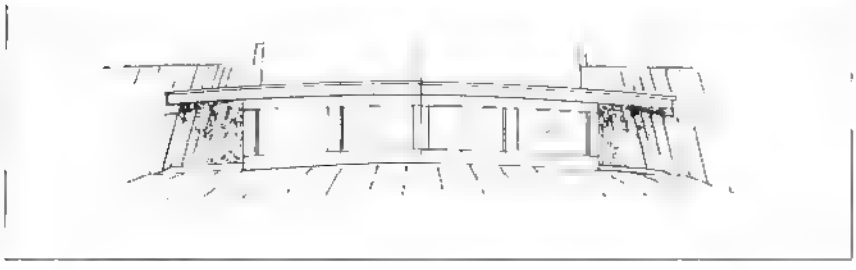


Figure 51

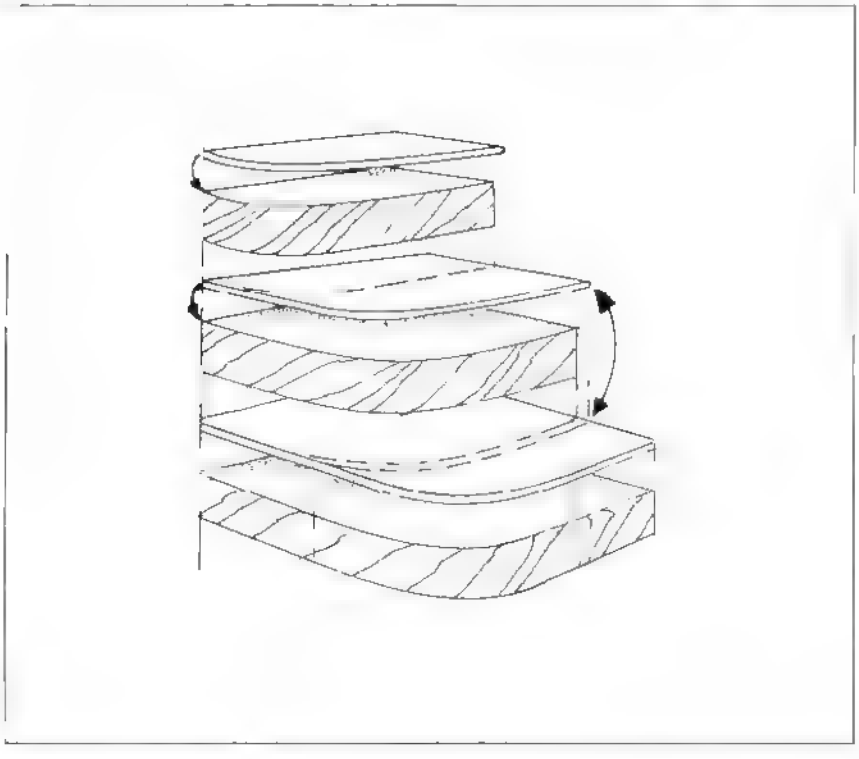


Figure 52

planks in one piece and rule in the deck caulking with a 3-0 drafting pen and ink. The effect is quite good and only a close look with the magnifying glass reveals the trick.

After all the deck planks were installed work could begin on completing the painted railings at the two breaks. McNarry's model indicated that both were painted friezes and I decided to follow suit. By far, that frieze at the quarterdeck was the most troublesome. At the fore end of the curved portion, the short frieze tapers down to meet the side panels of the stairwell. Rather than try to bend this very tight curve, I decided to cut it from a solid block the height of the frieze, and then to sand it down to the 1/32" thickness. The underside of the frieze must be curved to the deck camber after shaping. It's bordered, top and bottom, by a thin rail and footing, then topped with a similar railing running across the top supported by small stanchions.

The break at the poop has a similar frieze, however its ends are not curved but straight, terminating in a hand post at either end. The rail that runs over the top of the hood must be indented to fit over the curve of the doorway at its after edge. The railing is set back from the fore edge of the door slightly covering the seam between the deck planks and the margin plank. To relieve the heaviness of the rail it was beaded on both the fore and after edges with a moulding cutter. Since there was still considerable work to go on the model, I didn't install the top rails for either the quarterdeck or poop at this time. They were set aside with the gallery and hood for permanent installation later.

Before beginning the gratings I would have to complete the windlass barrel and its fittings and install the supports for the gratings at the transom, and the beam forward at the fo'c'sle that would support the gratings there.

The Greenwich photo indicates that the gratings aft were below the cap rail at the sides. The inboard side of the carved transom was lined with a thin sheet of wood which follows the curved arching of the carving. I planned to use the lower portion of the lining I'd installed as a support for the after edge of the gratings. This would cover the seam between it and the upper portion forming the back of the carving. At the sides, I installed short lengths of railing similar to those used on the main deck for support at the sides.

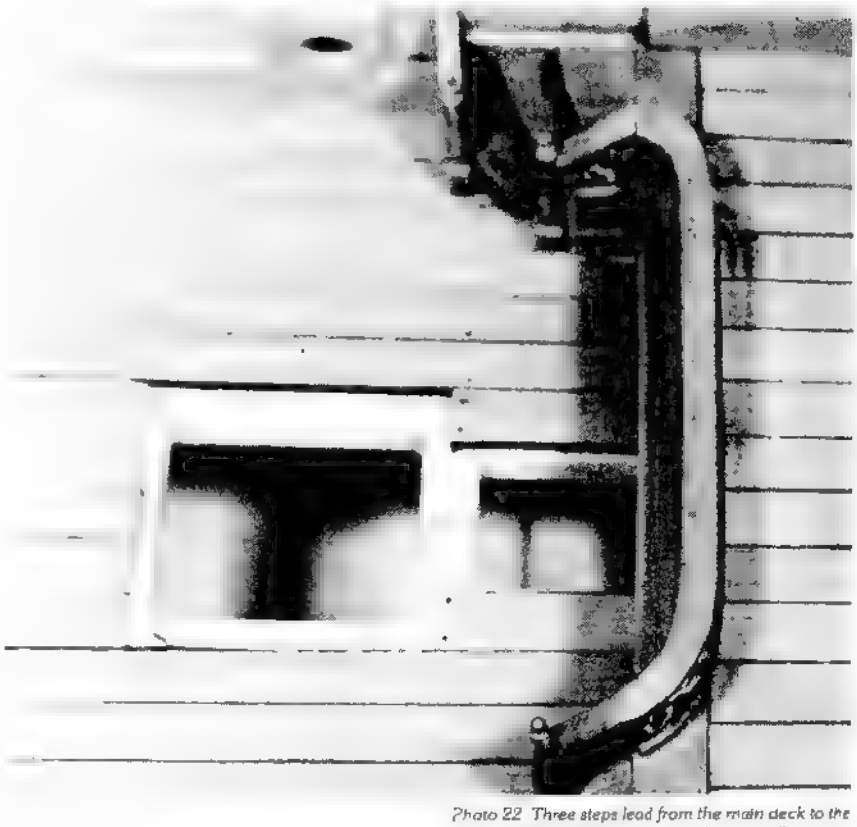
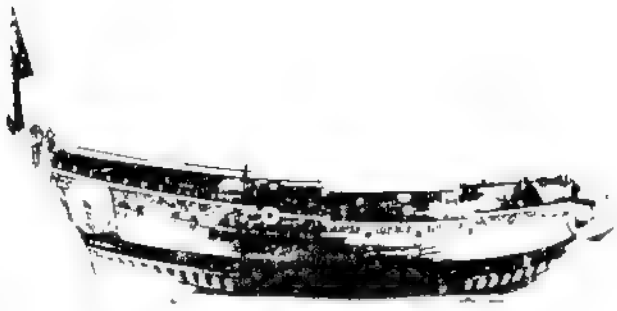


Photo 22. Three steps lead from the main deck to the quarterdeck. Mouldings surround the stairwell supports and banisters. The bulkhead sits on the beam or margin plank.

Photo 23. The painted friezes at the breaks for the quarterdeck and poop. The underside of the quarterdeck's frieze must be curved to the deck camber after shaping.

10



Continuing The Deck Details

I'd like to say a bit more about the turned stanbions and posts touched on briefly in the last chapter

After the first ivory turning was complete and tried on the model, there was no doubt in my mind that the contras was too great and that another materia would have to be chosen. The glare of the white ivory against the dark apple wood was distracting. Perhaps the ivory worked well on the Greenwich model, because the lighter wood used in that model gave less contrast, and the ivory had aged

very small stanch ons at their thickest part is about 1/32". To make them from applewood was beyond my capabilities since each would require a hole bored through to hold a pin Making these in brass allowed me to turn in pins at each end, thus eliminating the need for a hole or pins to secure the stanchion to the railings A harder wood such as box would probably work well, but apple wood grain is too open for such small turnings even if you don't bore for holes and include the pins in the turning About 18 stanchions

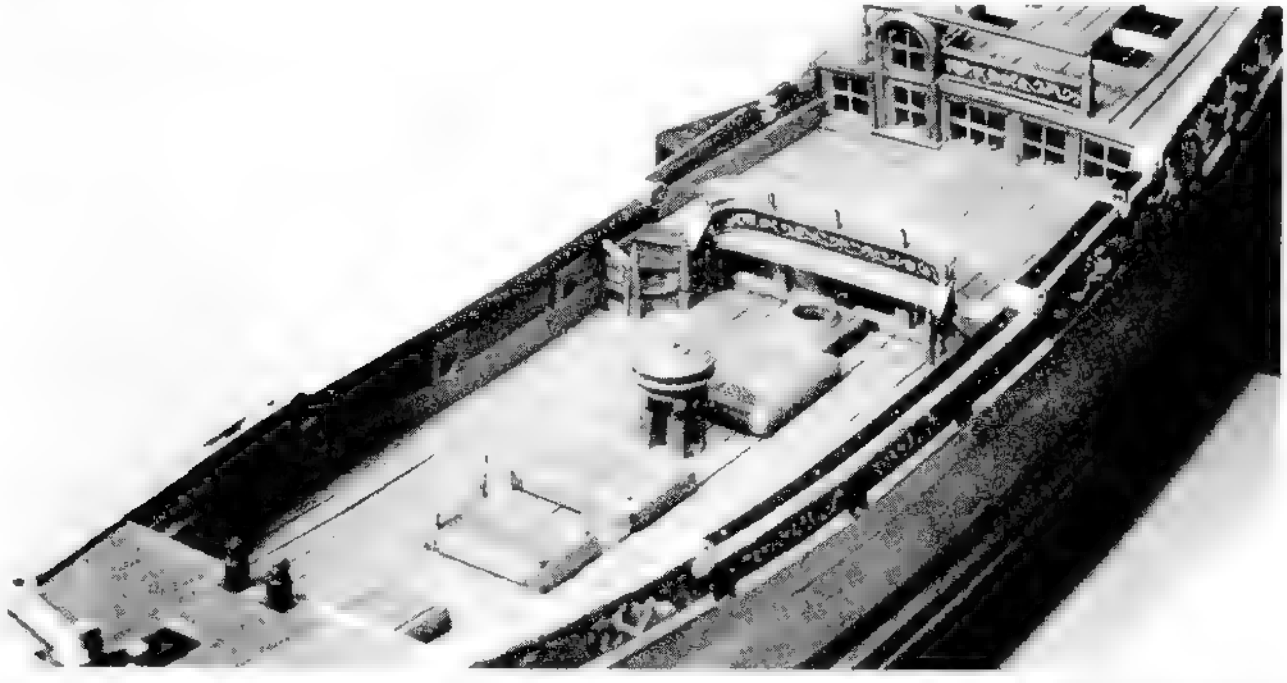


Photo 24 Deck fittings and gratings are just set in place to illustrate this instalment Note the stanchions and rails at the quarterdeck and poop and the carved heads of the bowsprit bitt at the bows

Photo by Deborah Donovan

Consequently, I made the turned posts for the stairs and railing on the poop deck from apple wood

The small stanchions for the quarterdeck rail, and later the rough tree rail of the poop and quarter deck would be made from brass The diameter of these

per side are needed for the rails and five for the short rail of the quarterdeck (Photo 24). I used round stock to turn these small stanchions on the lathe

The first step is to mark the length of the stanchions on the stock while it's turning in the chuck. Plan for a 1/8" long

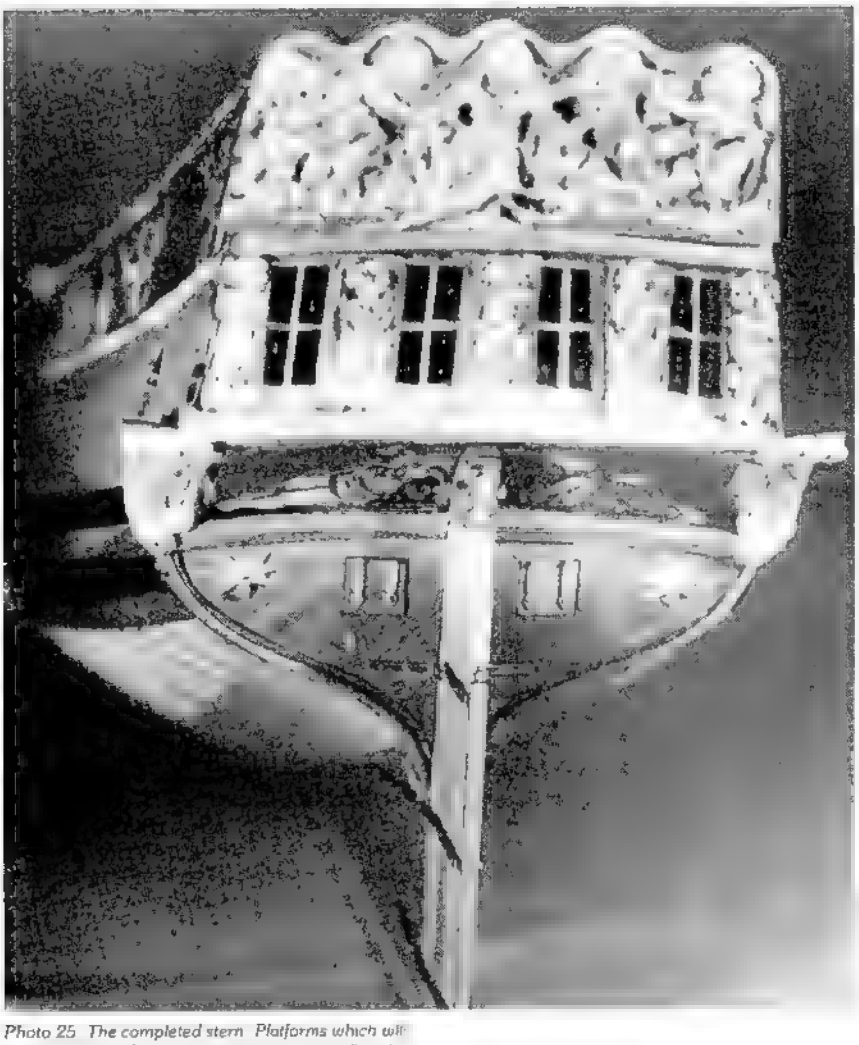


Photo 25 The completed stern Platforms which will support the side figures are clearly seen as well as the decorative moulding that covers the end of the hull's side planking Photo by Deborah Donovan

pin at the lower end and 1/16" long at the top In gauging the distance between the turned portions, allow for both the pins and the kerf (thickness) of the saw blade for cutting off. I used a fine razor saw for this operation, but a jeweler's saw will do

Keep the turnings consistant by making a template from a piece of scrap steel filed to shape. The curves should be simple with a small pedestal at the base Turning these freehand, trying the template as you go. After a while you'll develop a rhythm, and the work will go quickly If the turning is done in stages, first the top pin, body, and lower pin, there will be less chance of the unit breaking off before you've finished. Keep the bulk of the unfinished portion in the chuck and only pull out enough stock to turn one part of the unit at a time

Turning the wooden posts for the rail at the quarter deck and stairs is done more or less in the same manner This time square stock is used, but again only the portion of the turning being worked on is pulled out of the chuck. As each section is completed, it should be lightly sanded with fine finishing film, then burnished with a scrap of hard wood, such as maple This will close up the pores of the wood and leave a pleasing shine The wood as well as the brass will heat up as the turning is made, so keep this in mind when you do the burnishing Light pressure is needed or the wood can burn, or dry out and snap

Polishing the small brass stanchions is best done while the pieces are still in the chuck on the lathe and before the final pin is turned A little jeweler's rouge and a rag is all that's needed If a gilded look is to be maintained the stanchions can be lacquered. This is easily done by standing them up in a strip of modeling clay, then giving them a quick spray with some flat drying lacquer. When dry remove the stanchions and clean off the pins with a soft rag

Installing the posts and stanchions goes quickly. The posts are pinned at their lower ends, then tapped home with some glue at the stairs The same is done with those for the rail, except that only one can be put in place before the rail running across the hood of the stairwell is cut and shaped. Because it must be let somewhat into the curved top of the hood, this makes it a tricky piece to fit. It must also be grooved to slip into one of the ridges of the turnings

Getting one end fitted is the key, then bending to locate the approximate position of the concave curve of the underside which fits over the hood Once that's done, proceed to the end, trying the post against the rail and filing the end of the rail back until it fits. The rail can be slightly heat bent to the curve, glued into position, and then the post pinned to the lower part of the freeze at deck level

The stanchions simply set into their marked position on the rail running across the quarter deck and sloped side rails The upper rail is positioned over the tops of the stanchions and gently pressed down to leave an impression on the underside It's then removed and holes are bored for the pins to pass through. The rail is repositioned and a spot of epoxy glue is applied to each pin prior to pushing the rail down on top. Pin heads are nipped off and filed flush with the top of the rail Both rails are given a final sanding, a coat of Val Oil, and allowed to dry overnight

Before proceeding with the inboard hatches and gratings, it was necessary to complete the stern and counter carvings I had planned to make all the gratings for the hatches, fo'c'sle and stern at the same time, but to do so, the rudder would have to be completed and installed. This is a classic case of thinking ahead, or backwards if you like to simplify a job of installation

The stern carving is a separate unit from that of the sides which extend the width of the transom There are two standing figures on each side which stand on a pedestal that forms a part of the counter carving Looking from aft, the carving at the counter curls down from the margin plank of the upper edge of the counter Its purpose is to cover the ends of the hull planking

The portion of this carving that is seen from the side is actually a separate carving altogether. This is clearly shown in the photographs of the Greenwich model's starboard quarter, sent to me by Donald McNarry. Even without having seen the photographs, I'm sure I would have done the carving in this manner anyway

The side carving is the more difficult of the two, since it must lay against the side of the hull snugly and also meet with the inward curve of the counter carving. Plan a full evening for these (Photo 25). Some relief from this tedious job is carving the two small stars which are located at the stern off to the side of the ports. Not having the rudder in the way while all this work proceeded was, for me, a lot easier. But now the rudder would have to be constructed and installed

The Greenwich model shows a built

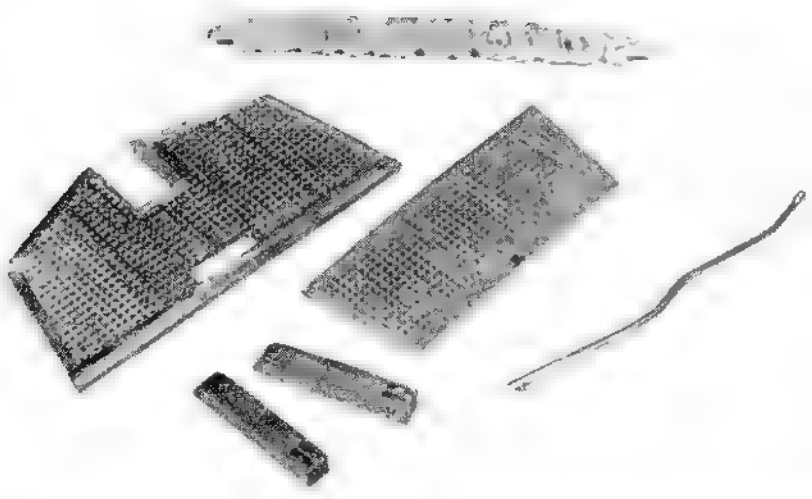


Photo 27 The start of the carving for the fo'c'sle railing is at the top. Just below are the bow and stern gratings. To the right is the tiller arm and at the bottom are the two catheads with their sheaves.
Photo by Deborah Donovan

up rudder blade and I decided to build mine in the same way. The components are shown in Figure 53. I alternated the grain, although I don't know if it's absolutely necessary. Each section of the blade was tapered before the next unit was applied. Plan the location of the pins to avoid hitting the gudgeon straps' bolts later on. This assembly was completed in one sitting and then allowed to dry under clamping overnight. Due to the taper I found rubber bands worked best.

Next day, the final sanding was done followed by marking the location of the gudgeon straps on both sides of the blade. I wouldn't have thought that the eyes for the preventer chain would've been located so far up on the blade's post, but it occurs just at the lower edge of the upper counter. It's from this point to where the rudder post enters the hull that the blue background appears again and some slight scroll decoration is shown on the Greenwich model.

This wouldn't be a working rudder and, therefore, it wouldn't be necessary to have the gudgeon and pintle arrangement a movable one. They do have to fit snugly around the 45 degree bevel of the sternpost and fore edge of the rudder blade. It's a good idea to file a shallow groove in the wake of the straps on the blade. This helps to keep them in position as they are pinned to the blade. Be sure to pre-soften the brass used for the straps over a flame and heat to a cherry red. Use a fine needle pounce to mark the locations of the holes for the straps bolts. This must be done after the strap has been fitted to the blade and to the hull.

The joint between the gudgeon and pintle can be pre-tinned prior to mounting on the hull, then touched with the iron once on the model or pre-assembled and fitted on the blade. This is how it was done on my hull. Just before doing that, however, one last detail had to be completed, again for convenience sake. That was to put on the covering moulding that goes below the previously installed one which forms a type of trim on the lower counter's edge. The final installation of the rudder blade is seen in Photo 26. With this task complete, I could proceed on the inboard works of the tiller arm that would be covered by the grating at the stern.

The long tiller arm had to be turned to shape from round stock equal to its thickness at its widest end where it fits onto the rudder head. Because of the tiller's serpentine curves, an overlong piece of brass was chucked into the lathe. Only a bit of it extended beyond the chuck in order to turn the knob at its end. Again the taper was put on in stages back to within about an inch of its end. Then the piece was given an overall taper, polished and removed from the lathe. The finished tiller arm is seen in Photo 27. Once the well and tiller were fitted, they were set aside until work on the grating was finalized.

Similar preparations were needed at the bows for all the inboard details that would be covered or partially covered by the grating over the fo'c'sle. Aside from the windlass there is also the bowsprit butt, bowsprit, the supports for the grating, catheads, and finger-like pawls for the windlass barrel. The windlass supports had already been completed and laid aside; now my attention could be given to making the barrel. I used lemon wood cut square for its construction. This wood has a pleasant light color without the glare of a strong white, nor the intense yellow of box, and would provide some light under what would be a rather darkened somber area under the grating above.

After laying out the length of the barrel, center lines were drawn through the middle and down the length of each of the sides. Next, the positions of ratchets were marked on, then cut through to a depth of about 1/32" on all four sides of the barrel. This keys their position and makes it easier to finish off once the barrel has been tapered. Next, the squared barrel is made eight sided, then tapered to the size shown on the plans. The holes for the

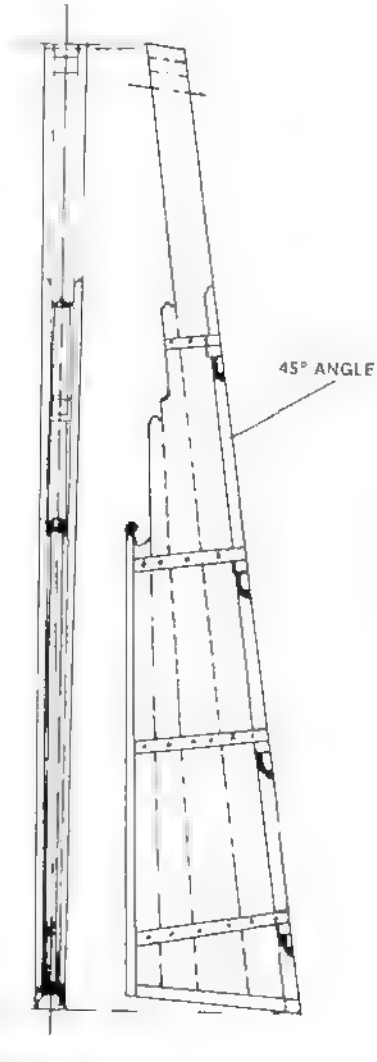


Figure 53

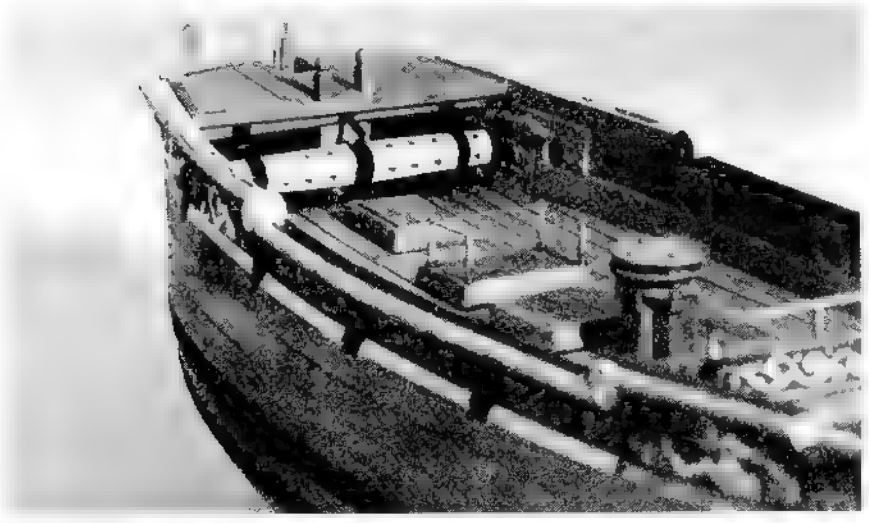


Photo 28. The windlass barrel along with the beam that supports the fo'c'sle grating with its fingers. Behind the central one is the lower portion of the bowsprit bitt. Note the large cleat over the support for the barrel to the right, just forward of the port opening.

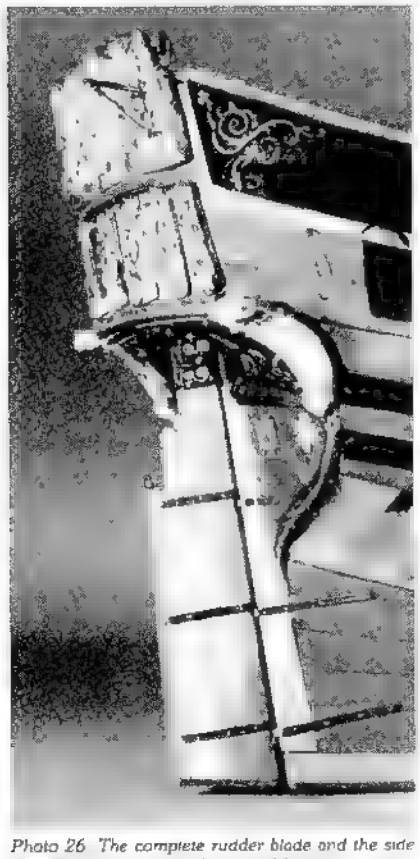


Photo 26. The complete rudder blade and the side carvings which support the carved figure that covers the ends of the stern carvings and hull planking. Note too the bracket for the stern light in the upper part of the photo. Photos by Deborah Donovan.

heavers are marked as indicated, then bored, and finished with a square needle file.

It's at this point that the ratchet locations are rounded within the grooves already provided for them. On the Greenwich model there are ivory guides which prevent the cable from sliding into the ratchet gear, but I choose not to use the ivory here. Either thin metal or lightweight card can be used, since it will be painted black. In any case, the card is the easier route and it will glue well to the barrel.

The centers of the ends of the barrel must be bored for the pins of the brackets which secure the barrel to the bulwarks. This done, the barrel can be positioned but not fastened completely to the hull at this time. Only one of the brackets that hold it was secured at this time, leaving the other end loose so that the barrel could be removed from time to time as work around it was fitted and completed. In fact, these photographs were taken when the whole area was held together with just a prayer that nothing would come loose before the shutter clicked. (This is one of the difficulties of photographing "as you go" when writing a book. Not all of it can be, and sometimes the choices of what to show and when can be hard.)

Directly behind the windlass barrel is the bowsprit bitt. At its upper end are two stanchions whose tops are in the form of carved heads. The upper edge of the bitt is flush with the upper face of the grating when in place (see Photo 28), and the two stanchions also protrude to just above the carved work that acts as a railing support at the after end of the fo'c'sle's grating. Under the grating are clamps which support it against the bulwark and a stout beam which is located under the after end. This beam carries the finger pawls for the windlass barrel and on my model these were shaped from 1/32" thick brass strip about 1/8" wide. Pins were formed on their inner ends so that they could be inserted into the beam in holes provided for that purpose. These are painted black.

Once this beam is in and the supporting clamps at the bulwarks are installed, nothing prevents you from now cutting the grating material for the hatches, stem and fo'c'sle. This is not only a delicate job, but a dull one at that. What seems like miles of grating material needs to be cut for all the areas just mentioned, plus some extra just in case some are spoiled in the cutting process at the last minute. The thickness sander was used to run strips of applewood 1½" wide by 18" long to the required thickness. This long strip was then cut up into approximate lengths for each of the necessary units.

Until a few years ago, I had gotten along with a jury rigged grating attachment. Then a friend made a proper one for me that fits the bracket of the Unimat saw table. The slot for the blade just clears the kerf of the saw. Now it's possible to cut very fine slots without the danger of them slipping between the blade and the edge of the slot.

The first cut is made with the grain and the second at right angles to the first (Figure 54). The width between the cuts is 1/32", producing 1/32" squares when the grating blank is completed. These small gratings can and usually do chip off at the ends of the cut if not held perfectly straight, more so if the saw blade is dull. Strips are laid fore and aft in the grooves giving you a pattern of small open holes, more clearly seen in Photo 28. The strips used were 1/32" x 1/16" deep provided to me by Warner Woods, West of California.

The saw blade must be set so that it cuts about 2/3rds through the blank material. This provides a firm base for the grating and at the same time leaves only a minimum to be removed by sanding the back of the finished grate. The apple wood produces some pesky fuzz in the cuts that is removed with a fine knife needle file. After cleaning up the blanks the strips are glued in and allowed to dry before sanding them flush with the top of the grating. Knock out the dust and regluе any loose strips. This sometimes happens from the heat generated by the sanding.

The blank can be turned over and the back carefully sanded away until you begin to see the emerging squares. A strip of duct tape held in your fingers and pressed against the front of the grating blank will enable you to hold the small piece up to the sanding disc without burning your fingers. When you've completed all the blanks they can be set aside and work can begin on building the hatch coamings. We'll leave the major grating areas at the bow and stern for the moment until the hatches are complete.

Something you'll have to think about doing before permanently setting in the windlass and bow grating are the anchor cables. These feed down below through holes in the hatch just aft of the ladderway. You will have to lead them through the hawse holes and around the barrel. Tie them up out of the way until all the work on the main deck is finished.

Hatch coamings and their linings are built separately on the model. Strips are

cut to the length and width of the hatch coamings as shown on the plans. The duplicate or matching sides are run through the saw as shown in Figure 55. The crown of the hatch is then marked on the fore and aft ends of the coaming and shaped. This can be done on the sander for the top curve and a small sanding drum used for the lower edge.

Since mine were designed to fit into the deck the curve also had to be cut on the lining material. This would be important if you planned to leave any of the hatch gratings off as in the case of the ladderway, but I decided to grate over all the hatches including the ladderway as in the Greenwich model. The sides of the coamings are glued and after applying the linings that support the gratings, these were set aside until the gratings for each was complete.

All the gratings have border material about 1/16" wide glued to their edges. These can be butt joined and glued, and is straightforward work. The only exception is the grating at the main mast hole. Because of its delicate nature and the fact that it is one of the two smallest, it's recommended that the mast coat first be glued in position, then beginning with a small pilot hole, gradually increase the hole until you reach the inner edge of the mast coat. This will help keep the grating from crumpling in your hands before it's finished. Once this is done, the grating can be glued into its hatch.

At the forward edge of the grating that will hold the anchor cable, drill two holes, one in each forward corner. These should be slightly larger than the 1/16" diameter cable. The corner material will allow for this, then smooth with a file. This operation should be carried out after the grating has been glued into the hatch coaming. The railing for the ladderway is the only remaining job to tackle at the hatches.

Posts are turned, 3/64" brass square stock. To secure the posts to the hatch, pins are turned into the lower ends of the posts. Before turning, the tops are bored for the surrounding rail that will close in the ladderway on three sides. The two back posts on the starboard side have holes bored into the two inner sides while those at the front or port side have holes bored only in the athwartship direction. Fine brass wire is threaded through after all four have been turned and fitted in position.

Another template is required for controlling the shape of the posts, and the marking and turning procedure is the same as before. Once these are turned the wire can be threaded through the holes. Leave some excess at the front for adjustments and cut off after the rail has been epoxied into the top of the hatch. This one and the large main hatch should be left off the model until the deck work has been completed. The large hatch will allow you to locate the mast hole when it comes time to install the lower main mast.

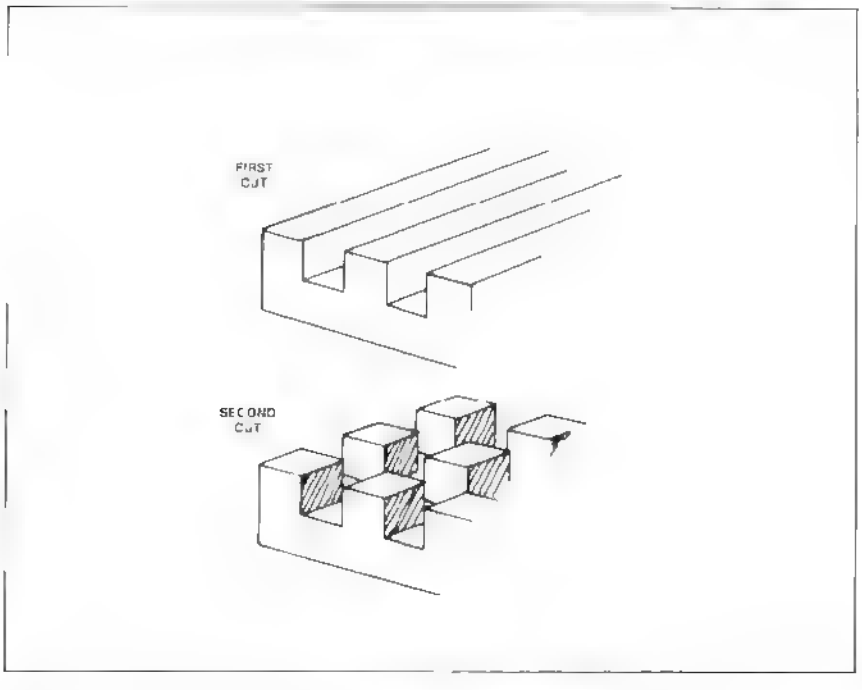


Figure 54

Making the gratings for the bow and stern areas requires a paper pattern for the shape. The easier of the two is the stern grating. The only consideration is the hole needed for the flagstaff. I noticed on the Greenwich model that they had lined the inboard side of the stern carving and the reason was not quite clear to me until I installed my own.

The upper portion of the carving laps over the upper edge of the transom by about 1/16". Due to the depth of the carving here, the surface is not particularly sturdy. On the outboard side there are stern lantern brackets, and inboard are the brackets for the flagstaff. FUBBS' sail plans shows that this staff is very long, and rather heavy. The lining gives added support and hides the seam between the back side of the carving and the upper edge of the transom. The lining from the deck to the edge of the transom is cut down to provide a landing for the grating on its after edge. This lining must be grooved to receive the lower end of the flagstaff. Once again, it's a bit of backtracking.

Firstly, turn the flagstaff from a length of applewood. I left the lower end square to keep it from turning on me once installed. Since the truck would be gilded I turned it from a scrap of birch dowel and while at it, did the trucks for the remaining flagstaffs at the same time.

This stern grating also carries a large double sheet block with a hook that goes to an eyebolt in the border of the grating. For those who will be using commercial blocks on your model, keep in mind that these should be oval in shape and without "square" corners. This means some extra filing, but the end result is worth the extra effort. The back of the grating must be notched (see Photo 27) for the staff, then heat-bent for a slight camber. By making the side border material slightly wider, adjust for this curve by sanding back the un-needed portion until the fit is a good one.

The grating lies just under what will later be the railing of the poop deck. Once the rough tree rail is on, there will be security on the poop not now provided by the very low bulwark. The inboard sides of these bulwarks were also painted using Poly S Venetian Red.

This is a departure from the fire engine red usually seen painted on the inboard

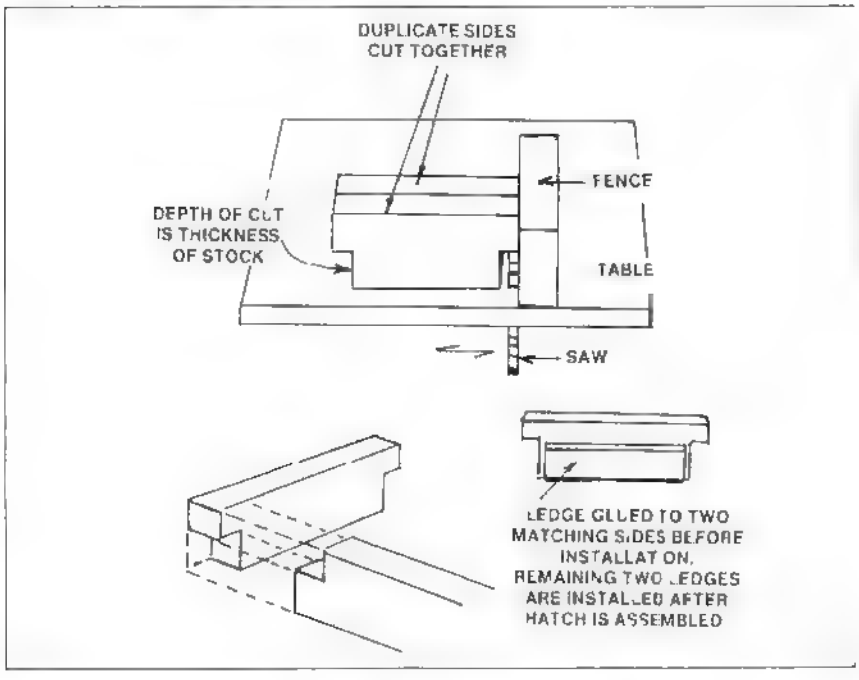

DUPLICATE SIDES CUT TOGETHER
FENCE
DEPTH OF CUT IS THICKNESS OF STOCK
TABLE
SAW
LEDGE GLUED TO TWO MATCHING SIDES BEFORE INSTALLATION. REMAINING TWO LEDGES ARE INSTALLED AFTER HATCH IS ASSEMBLED

Figure 55.

side of warships. Venetian Red is really more blood-like in appearance, and I wonder if it is not closer to what was actually seen on ships of the period. In any case, it blends well with the warm tones of the apple wood without too much attention being drawn to it. All this gear at the stern won't be installed until the railings have been cut and are ready for installation. Up front the story is a different one.

The bow grating can be cut and readily installed once the fittings below have been completed. Turn the bowsprit to the point of cutting its tenon. After the head work is finished, it can be epoxied in its butt, pinned, and glued to the deck below the grating. The bowsprit cuts through the grating as it passes inboard, and this area has a border, too. The main portion of the bowsprit was cut to an approximate height, with the stanchions let into each side once the height of the grating was established. Making the butt in this manner allowed me to fit the bowsprit tenon into the mortice cut in the lower end of the butt ahead of time, then to finish it up later.

Keep in mind when cutting the hole for the mortice that it has an acute downward direction. Cutting a little at a time will give you a good fit. It should be quite snug.

With the butt pegged to the deck, it was simple to trace off its location on the lower side of the grating, then cut through for the butt and the stanchions. The border plank on the fore edge of the grating will act as a base for the carved support for the railing running athwartship. The fore edge of the border plank will have a moulding applied later. In its present state neither the crown nor the moulding have been put on.

There are two large cleats over the foremost gun ports that should be carved and installed while the grating is off the model. Another job that can be done now is cutting through the bulwark at the corners of the bows for the catheads. On the model, these were slit through with a razor saw followed by diagonal cuts with a jeweler's saw to remove most of the waste material, then filed flat.

The major support for the cats will be the curved supports under them. The catheads were cut, shaped to their inboard profile, then sheaves were installed at their outer ends (Photo 27). Once the gratings have been installed, the catheads will be pinned and glued into position. For now, they've been set aside.

At this point, parts of the cap rails have been started and the frieze at the sides are in position. The railings at the stern are still to be completed.

11

The Frieze & Gilded Mouldings

One of the photographs in the last chapter showed the painted frieze installed on the model. Before further work can be done, both the frieze and the gilded mouldings which border the top and bottom edges of it must be installed.

Whatever you have used for making your panels for the painted frieze, keep in mind that the edges will have a tendency to curl up after the glue has been applied unless you are using a contact type cement. I used the usual Titebond® glue and applied it to both the hull and the backside of the panels, starting with the narrow portion at the waist. This section is narrow enough not to cause problems with the glue curling up the wood in the time needed for the glue to become tacky.

Fore and aft of the waist there is almost no room to apply a clamp, so it's imperative to first bore for pilot holes that will hold small brass nails, or lill pins to secure the lower edges of the frieze while it's drying. The upper edge can be clamped with bulldog clamps padded with thin pieces of wood to prevent marring the surface of the frieze. Forward, it won't bend around the curve of the bow at the lower fore edge. Therefore, glue the frieze in position, then sand back the lower edge until it is flush with the hull. This small gap can be painted blue to blend with the background color. The cathead supporter lies just in front of this area leaving a small triangular area to be filled with color.

From the waist forward, the port openings have to be filed through to match with the openings on the hull. At the quarterdeck the upper edge of the frieze is filed after the gilded moulding is glued into position.

The gap between the frieze and the hull planking at the lower edge will be filled with the channels and the mouldings. This can be seen in Photo 30, where the channels have not yet been installed. Space is left on each side of the port openings for the decorative port wreaths and their locations, as well as those of the channels, should be marked in the gap. The top edge of the frieze forms a landing for the upper mouldings. There should be just a small portion of hull material showing above this top edge of the frieze at the waist, quarterdeck, and poop deck (approximately 1/32"), as a backing for the mouldings. The cap rails on these decks butt against the inboard edges of the mouldings at those locations.

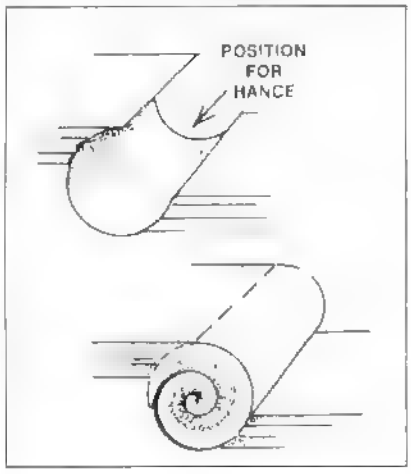


Figure 56

I cut all the lower mouldings a bit oversize so that they could be trimmed back to fit the port wreaths and channels. Most of them went in with little or no bending with the exception of the mouldings at the bows. Here they take a quick turn at about the location of the catheads. The supporter cuts through the mouldings at the bows so you need not carry any of the mouldings through this area (Photo 30).

At the bows between the upper and lower mouldings there is an additional one which divides the space between. On the plans it runs from the side of the carved tablet at the opening for the bowsprit to the seats of ease and has very little curve. On

Photo 29. Note the gilded mouldings in place and the gaps left for the channels and port wreaths. Inboard the stern lining is on and below the grating. You can see the tiller well and tiller. Also visible are the extended poop rails over the quarterdeck and at the stanchions.

the model I shortened the tablet and ran the moulding under it to the opening (see Photo 30). All the upper mouldings were also cut a shade longer than necessary to allow for fitting the round hances that appear at the bread of each of the decks.

Curved recesses must be cut for each of the hances (Figure 56). The hances themselves are carved outboard and made flush inboard. Inboard they are painted the same red as the bulwarks, while outboard they are gilded. I found it best to install the cap rails at the waist and quarterdeck before filing away the recesses.

The cap rail at the waist has a beaded edge on the inboard side. Since all the cap rails have a slight curve it's a good idea to make patterns for each of them. I gave all my rails a first thin coat of paint prior to installation, finishing up with a second coat that covered the tops of the cut off kill pins.

Next came the quarterdeck rail with its beading inward. I left its forward edge a little long so that it could be filed to fit over the hance. Once it was glued and pinned into position and dry, the port opening was filed through it and the moulding and frieze below.

The poop deck railing presents another problem in that it runs over the hance and extends to form the rough treerail for the quarterdeck. The portion of the rail which belongs to the quarterdeck is beaded on both sides, while the poop portion is only beaded inboard. This rail should be cut, bent to shape, then pinned into position to locate the point where it overrides the hance. It should be carefully marked, then removed for filing, a bit at a time, until it rides easily over the hances.

Naturally, the beading should be done prior to thinning out the rail by filing for the hances. I found it easier to bead both edges than to slice off the unwanted portion on the poop using the table saw. Where the saw approached the quarterdeck, the rail had to be filed back. While the paint dried on the completed rail, stanchions were installed in the same manner as the hand rail at the break of the quarterdeck. The poop rail could then be installed and pressed over the pins of the stanchions. The rough treerail would have to wait until work had been completed on

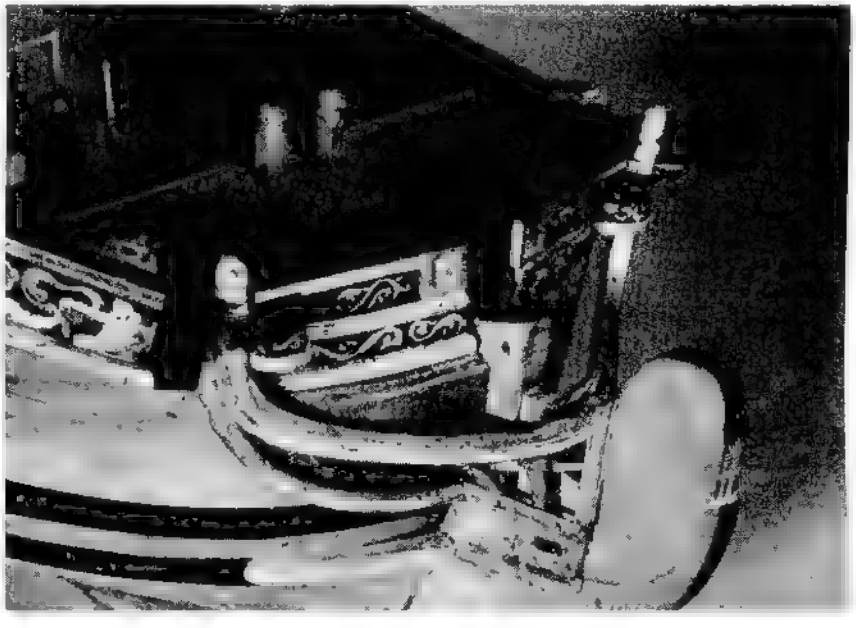


Photo 30. Note the position of the seats of ease fo'c'sle rails, carved heads at the tops of the main rail and the still unpainted snatch blocks on the cap rails. The galley stack is visible in the upper left hand corner. Note also the hole for the mainstay collar in the cutwater or knee of the head.

Photos by Deborah Donovan

the quarter galleries

At the bows the cap rail wouldn't be installed until work on the head rails had nearly been completed. It was time to turn my attention to the bolsters for the hawse holes.

These bolsters are made in two parts, an upper and lower section. The upper boundary of the bolsters is formed by the lower edge of the mouldings at the bow. Inboard the bolster butts against the sides of the stem and the outboard edge follows the sweep of the curved upper cheek rail that hugs the hull as it drops from under the cathead's supporter. This curve must be marked out on the hull.

The bolster pad's upper layer also butts against the stem but its upper and lower edges are slightly less than the layer below. Instead of following the curve of the rail it ends in a design close to that of the support for the windlass barrel (best seen in Photo 32). All edges but the inboard

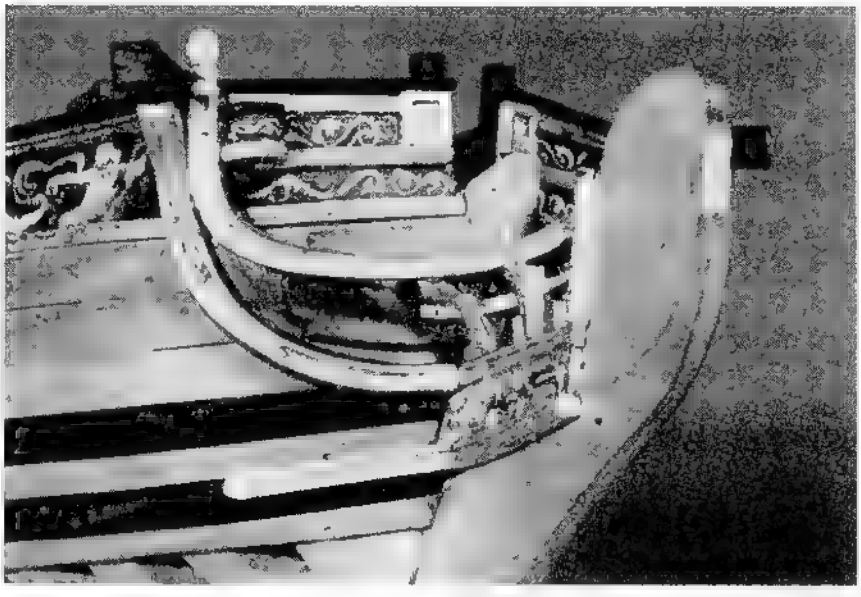


Photo 31. The complex and utterly trying head rails. Starting at the bottom is the lower cheek knees and rail. Between that and the upper cheek knees is the trailboard. Arching off from the upper cheek knees is the upper cheek rail ending in the cathead supporter. Sitting on top of the upper cheek knees are the three cross timbers. Behind the cross timbers is the middle is the middle rail. Resting on top of the timbers is the main head rail. The cross timbers have a substantial flare. Note also the carved tablets on either side of the bowsprit opening and the shape of the bolster's upper layer peeking out from above the main head rail. The two hawse holes are bored in the bolster while the hole for the mainstay collar is located in the cutwater adjacent to the lower cheek knee.

Photo by Deborah Donovan

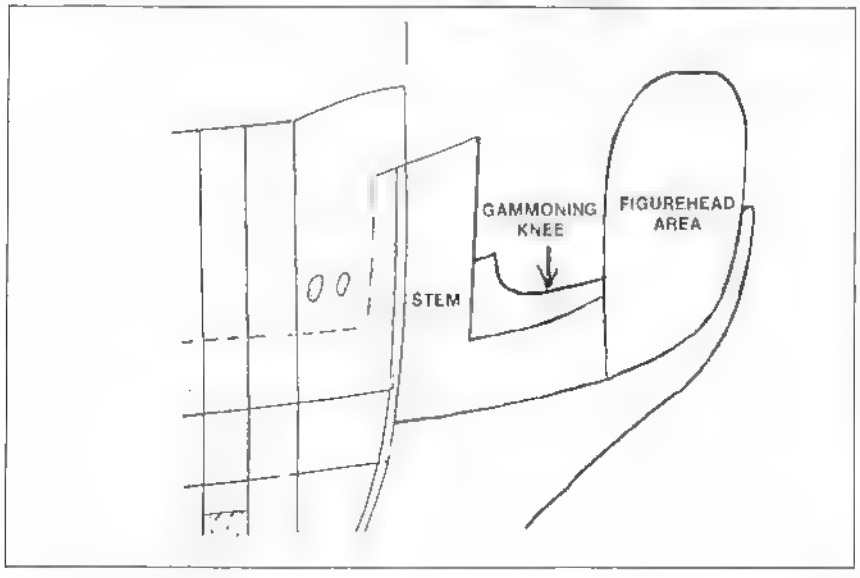


Figure 57

edge have a slight bevel. Both layers are about 1/32" thick, and are cut from applewood, with the grain running up and down.

Making a pattern for the lower bolster is a must, but much depends on understanding the curve of the lower rail of the head which terminates in the upper cheek knee against the stem. It's from this knee that the rail gets its name "upper cheek rail." This rail must run in an uninterrupted smooth curve from the cathead to the knee at the stem. Drawing it onto the hull in pencil is a help to getting it right.

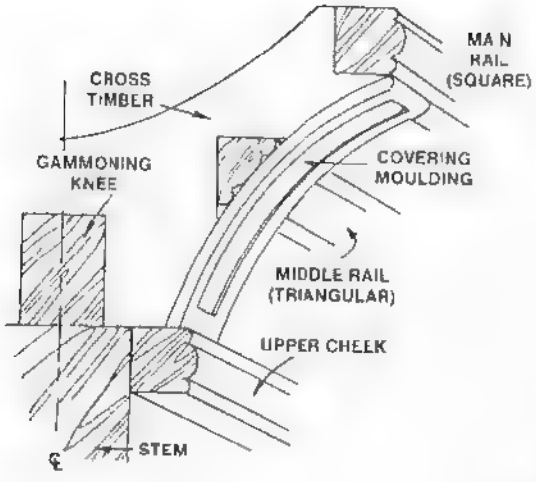
View the cheek rail curve from the front and side, then make your pattern off of it for the lower bolster. Mark the location of the hawse holes and before cutting out the piece, bore pilot holes. Wait until the bolster pad is installed before enlarging the holes or you might risk splitting the piece. Once it's glued into position you can file the holes with a needle file and correct any glitches in the curve. You might still have to steam or heat bend the wood to fit the curve of the bow. When the lower layer is on the hull you can make a second tracing for the upper layer, including the hole position and the design on the outboard edge.

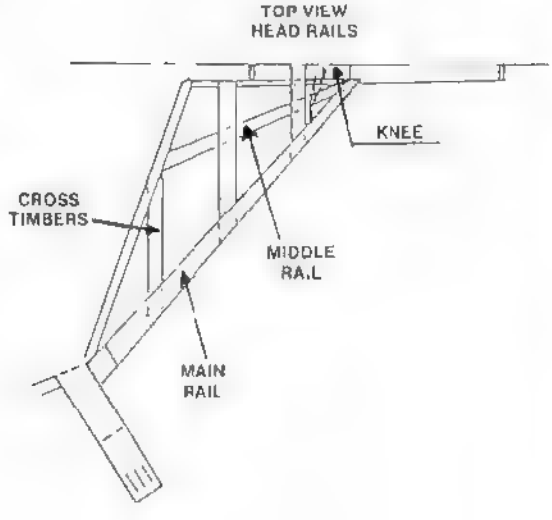
Clamp the bolsters to the hull. I was glad that I had not yet installed the fo'c'sle grating that would now be an obstacle to the clamps if it were fixed permanently. The bolsters were given a light sanding prior to installation but no Val-Oil was applied at this time since considerable work still needed to be done with the head work. The painting between the mouldings was also put off until the final fitting of the head rails was complete.

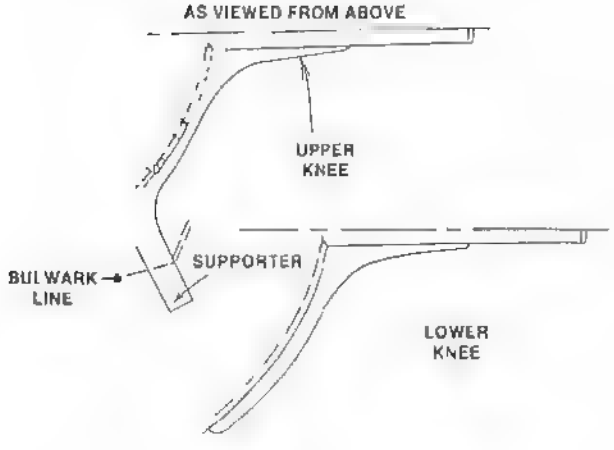
I tackled the gammoning knee next in preparation for fitting the head rails. It fills the gap between the stem and the area for the figurehead (Figure 57). The gammoning knee is slightly thinner than the width of the stem and forms a landing for the cross timbers (Figure 58). In some vessels these knees also support gratings. Part of the support for these timbers is shared by the upper cheek knees that lie against the stem. Depending on the shape of the head, the cross timbers sometimes straddle the gammoning knee, as in the case of the middle one on FUBBS.

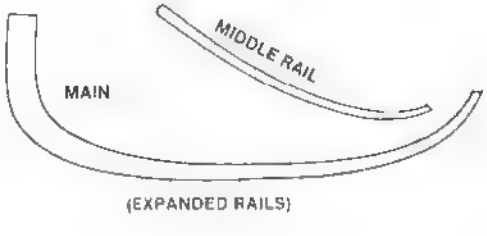
The next cross piece, towards inboard, butts against the side of the stem, and although the Greenwich plans call for a third 1/2 cross piece I'm not convinced that one was actually fitted there since it would conflict with the hawse holes (Figure 59). The outboard edges of each of the cross timbers is covered with a thin strip of wood, with a shallow beading on the edges. The outermost one, more clearly seen in Figure 63, simply borders the back edge of the figurehead at the knee of the head.

Without question, the head is the most difficult section to build on any model, largely because the rails making up the head must be kept unfixed through most of the









Figures 58,59,60 & 61

building process. Allow yourself plenty of time for this area

Construction of the head begins with the upper cheek rail (Figure 60). On FUBBS it runs from the cathead support down to the stem at the level of the upper cheek knee against the side of the stem. Here its inner end is beveled to match the bevel on the cheek's arm that runs out and upward towards the figurehead.. This cheek rail completely hugs the hull down its entire length. The rail should form a continuous sweep (Photo 33) when seen from the side

The main rail forms the upper boundary of the head rails giving them their distinctive curve. It runs from the back of the knee of the head (figurehead area), back to the side of the cathead. Where the two main rails meet at the back of the figurehead there is a small triangular-shaped knee which joins the two. Its underside has a slight bevel to conform with the sweep of the rails and also to allow to rest against the inboard sides of the rails.

What surprises those doing this construction for the first time is the fact that the rails, in reality, don't have the shape that is shown on the profile of the vessel. The reason for this is that the rails are not in the same plane as that of the hull, but are set at an angle towards the centerline of the hull. This means that the rails must be expanded to show their real shape (Figure 61). The main and middle rail are shown in this figure. The main rail is capped with a carved head that protrudes above the level of the cathead, but it is not shown in the illustration. The middle rail runs below the main rail from a point slightly below and inboard of the inner hawse hole.

Completing the head rails is the lower cheek rail (Figure 62). This rail hugs the hull, then curves up the stem forming the lower boundary of the head. Between it and the upper cheek is a short trailboard that only extends back to the hull. The gammoning slot is cut through it just forward of the formost cross timber (Figure 63, and 1/16" below the lower edge of the upper cheek

On the model, all the rails, cheeks and cross timbers have their outer sides beaded and gilded. McNarry painted the inboard sections of the cross timbers black but I felt it gave too heavy an appearance to the whole structure. Therefore, I left mine natural with just the outboard sections gilded.

STARTING THE RAILS

In the last chapter, I mentioned cutting through the upper edge of the bulwark at the bow for the cathead. This cut is made diagonally down to the upper face of the grating at the fo'c'sle. The plan of the upper deck shows the angle of the cut. It's best to use a razor saw for this operation because you will also be cutting through the delicate wood of the painted frieze and

this type of saw wil be less likely to tear the wood

Once the vertica cuts have been made two more are made, but this time at an angle to clear the excess wood from the slot for the cathead The remainder can be cleared with a square needle file

At this point the grating is still not fixed, but just pinned in position to establish the depth of the cuts to be made. The supporter for the cathead is the same width as the cat, but its lower end curls in towards the centerline. The joint between it and the cheek rail should come at the lower moulding on the hull

You'll need a wooden chock slightly wider than the width of the cathead and slightly longer than the distance from the cathead to the lower moulding. This will allow you some material to work with when fitting the rail and the lower end of the supporter. Using the curve you drew in for the bolsters as a guide, draw in the outboard curve Lightly sand back the lower edge of the supporter to match this curve, then go to the inboard curve You'll note on the plans that the catheads tip up slightly This means the upper side of the supporter will have to be given a slight bevel to match

When you're satisfied with the shape, you can pare back the excess moulding material and begin to shape the back

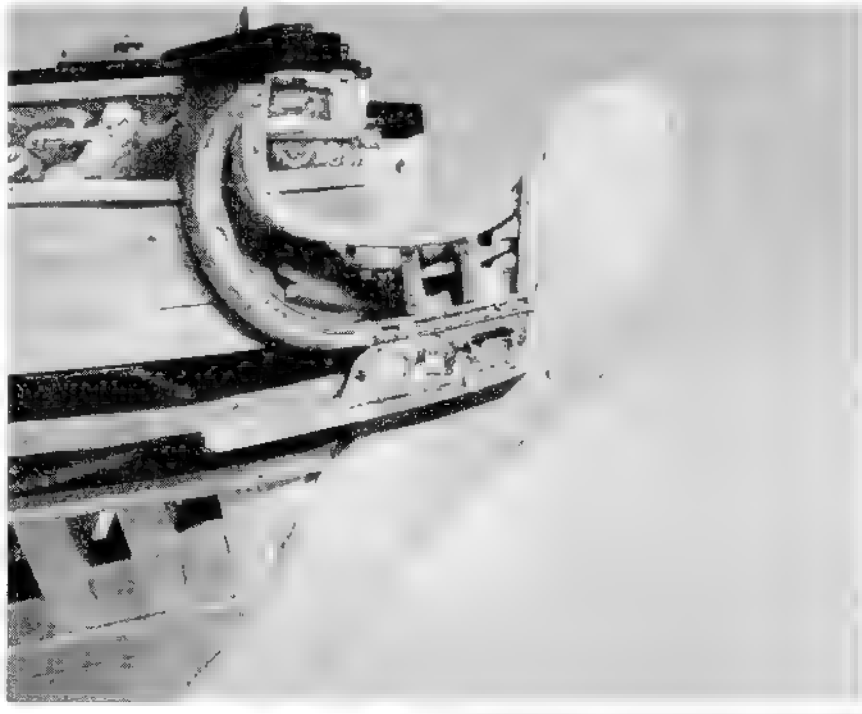
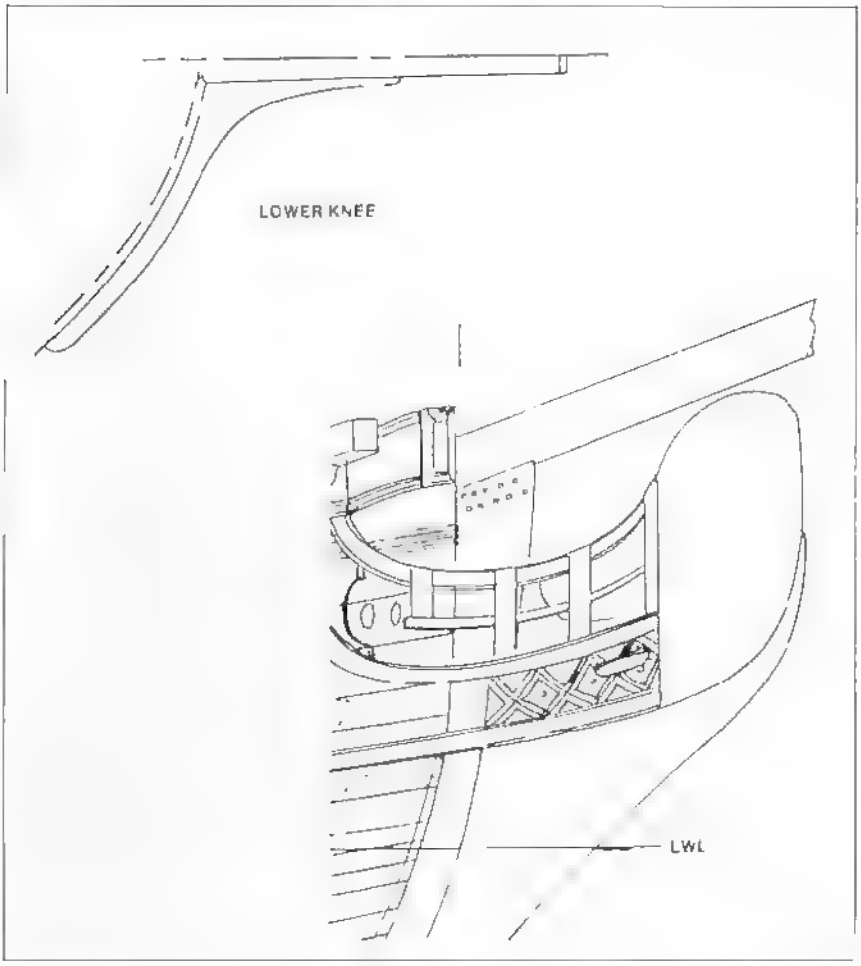


Photo 32 Note the sweep of the head rails from the side, the carved trailboard, gammoning slot behind the first and second cross timbers Also note the upper cheek knee, main head rail, and the small triangular section still without scrollwork behind the cathead supporter. *Photo by Deborah Donovan*



Figures 62 & 63

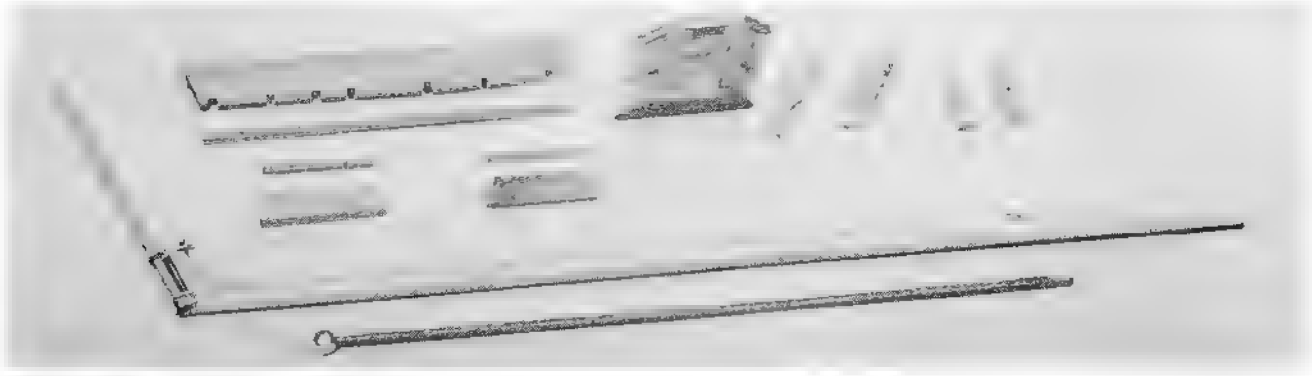


Photo 33 The top row contains the channels and their mouldings, glazed quarter galleries, side carvings and the unpainted knightheads with their gilded heads. Below are the unfinished bowsprit with its jackstaff in place (Note the tenon and gammoning cleats) and the completed flagstaff for the stern

Photo by Deborah Donovan

portion that lies against the hull. The curve beneath the supporter can be worked in to some extent now, but should be finished when the lower portion of the cheek rail is finished and fitted against the bows.

Make a paper pattern for the cheek rail, then rubber cement it to your stock. It's a good idea to cut it slightly oversized so that you can make adjustments as you fit it. I made my rails from apple wood, but you may use any fine grained hardwood that will take to bending. Once you are happy with the shape and the fit, you can bead the rail. The best method is to cut a recess down the center down the entire length of the rail with a small rotary saw 1/8" in diameter. As the rail thins out toward the outer end, exercise care, or better still, switch to a fine knife file to finish up. I used a knife shaped bent riffler to get around the tighter curves. After sanding the edges, it appeared as though the railing had a fine beading.

Since the whole rail is a rather tight curve, there is no way to avoid some diagonal grain. Therefore, it's better to position the pattern so that the wider portion uses the diagonal grain. Because of the grain problem the next step must be done very carefully and that is to give the rail a slight curve by heat-bending it. This also will relieve any stresses in the wood when you finally attach it in position. Dampen the back of the rail before applying the heat to prevent the wood from becoming brittle. Once it fits against the hull, bore pilot holes for pins which will secure the rail.

With the rail temporarily pinned to the hull, check the joint between it and the supporter. Next, work in the beading on the supporter to match that of the rail, then finish the bead in the same manner as the rail. The two units can be gilded and set aside for installation later.

The straight portion of the cheek rail is made next. Note that it and all the rails end abruptly at the back of the figurehead area. At the inner end of the cheek rail where it meets the hull, it is mitered. Cut the miter on the straight piece and then transfer the angle to the rail portion after first pinning it to the hull. After you have a good fit, transfer the location of the beading and proceed as before.

Now make a tracing of the trailboard area including the gammoning slot. It's also a good time to bore for the bobstay hole in the cutwater and the collar of the mainstay. The gammoning slot should also be cut now if you have not already done so. The stock for the trailboards should be 1/16" thick. Rubber cement the patterns to the stock and cut them out. They should fit with their lower edges flush with the location of the upper edge of the lower cheek knee. Bore out the opening for the gammoning slot and finish off with filing while the trailboard is pinned in position. The carving on the trailboards is a simple lattice design, and it is easily carved using a #11 X-Acto blade.

The lower cheek knee, made in two sections, meets at a mitered joint in the corner between the hull and stem. The portion that lies against the hull is cut to the curve rather than bent. Its inboard side is beveled to match the curves of the hull. This bevel is also put on the outboard side that carries the beading and it's reduced as it approaches the stem where the beaded edges become almost parallel. The section which lies against the stem is treated as before.

Cut out the main rail following the expanded shape on the plans. Again, the rail is cut a shade long to provide some leeway while fitting the rail and also to give you something to hold onto while shaping the rail. The carved heads are separate units added later. A feature of this rail was its role in supporting the seats of ease. Formerly, FUBBS was fitted with a bulkhead at the bow, but in the 1724 refit the bulkhead was eliminated, thus altering the position of the seats. They are now located against the main rail (see Photo 31), and just below the cap rail moulding. The seats were turned up in the lathe from birch doweling, 3/8" in diameter to allow for including a false moulding and lid. The lid is painted black and the moulding gilded, between the two the area is painted blue with decorative scrollwork.

The middle rail is the last to be fitted and, in spite of its shape, is easy to make. If you want to bead this rail, try using the tip of the X-Acto blade (#11) to scratch it in, if you don't have a micro "V" gouge.

Next comes fitting the cross pieces. Cardboard patterns are really a must for getting a good fit. The innermost cross piece is made in two sections. One for each side of the stem. The upper and outer ends are notched to receive the main rail while the middle rail rests in a notch cut into its top edge. Patience plus trial and error will get this job done.

The second cross piece forward straddles the gammoning knee and is also notched at its upper and outer ends for the main rail. The middle rail can be put through a hole in the cross piece or notched out of the top edge. However, you may find, as I did, that the lack of material there will have you cutting this unit several times over. There is considerable flair to these timbers, so it will be important to fashion a special shallow moulding cutter to shape the covering boards that go over the outboard edges of the cross timbers. The stock for the moulding should be the width of the cross timbers, but allow enough material to run the moulding stock through the table saw. These mouldings should be sliced very thin because of the concave curve they will take when applied to the timbers.

Before the headrails are permanently installed, the paintwork between the bow mouldings should be completed, the bowsprit should be made and fitted to the bitts, and the knightheads on each side of the bowsprit opening carved into timberheads. Once the bowsprit is made and fitted, the grating can be permanently installed, followed by the catheads. Both the knightheads and the catheads were painted black. When this work is complete the head rails can be installed, leaving until

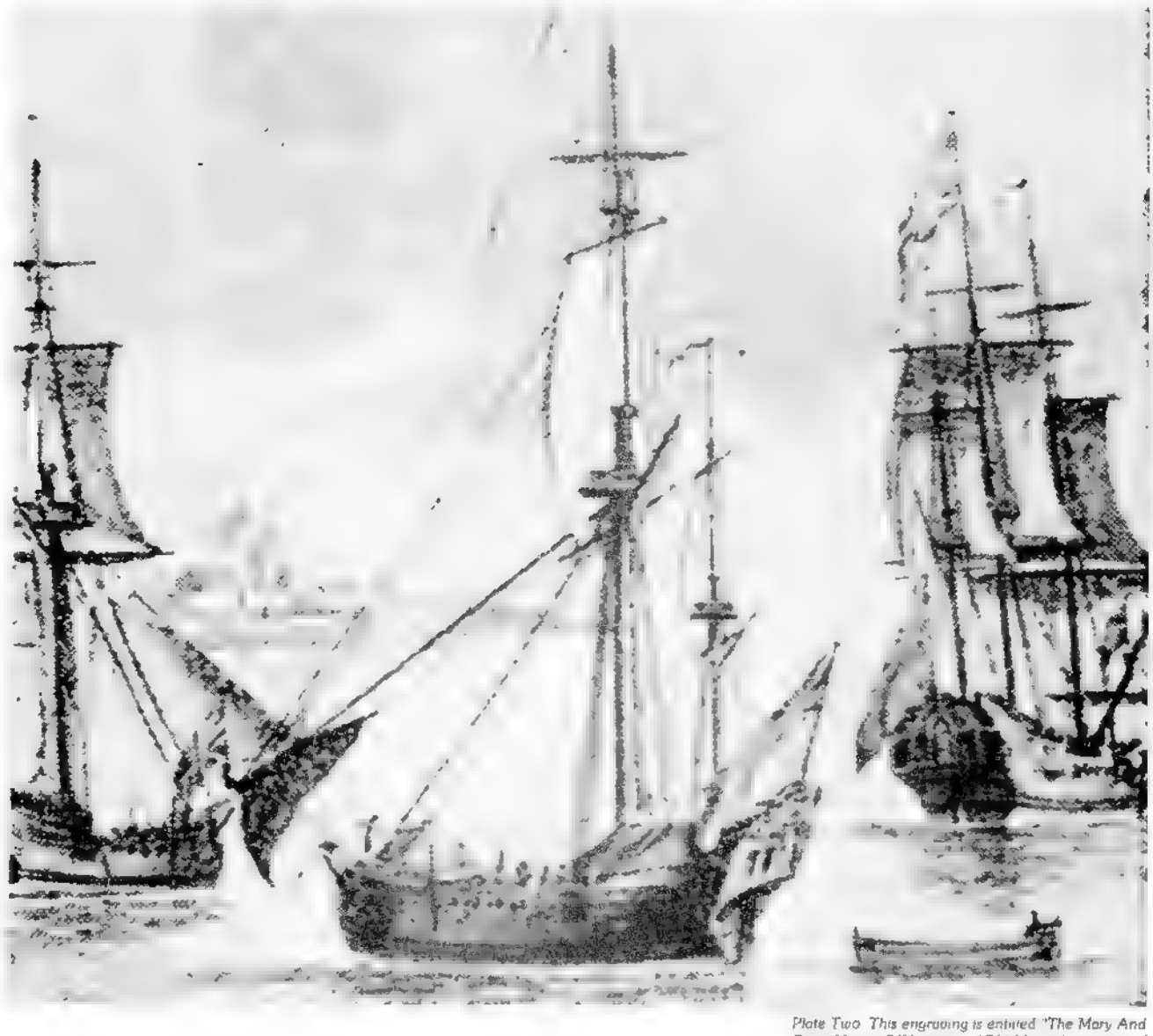


Plate Two. This engraving is entitled "The Mary And Other Yachts Off Harwich, 1761" from the catalog of the Macpherson collection of paintings and prints in 1930. This illustration was also used in Frank C. Bohen's book, The Sea, Its History and Romance.

last the installation of the seats of ease. These will need their back portions sanded to fit against the hull and the cathead.

Now fit the fo'c'sle cap rail. As previously mentioned, it rests on top of the mouldings and is fitted in two sections. The portion at the bow must fit around the fore side of the knighthead and up against the cathead. It's really best to fit this rail while the cathead is still loose. Both inboard and outboard edges of the rail are beaded. The rail at the side has a slight curve, so a pattern is needed for it.

The caprail ends at the hance of the waist. On top of this rail, aft of the catheac, is a snatch block with a brass sheave. It will be painted black, but is seen unpainted in the photos here. There are still three small timberheads to be installed at the bows on each side and another for securing the anchor on the side rail.

With the exception of ringbolts and cleats, the remaining deck fittings are about complete. The galley stack is in and the two knightheads at the foot of the main mast have been carved and fitted with their single sheaves (Photo 34).

One final note with regard to the hole for the main stay collar: the Greenwich plans show holes for lanyards at the stem (see Figure 64). There are ten holes in all, indicating that at the time the drawing of FUBBS was made it was thought that she would be rigged as Sutherland indicated in his sail plan (1717), with the mainstay set up to a deadeye with five holes.

It's understood that smaller vessels would lag behind in the advance of new rigging practices, yet James Lees in his book, *The Masting and Rigging of English Ships of War 1625-1860*, shows the BREDA with the use of the collar arrangement and the date is 1690. FUBBS refit in 1724 may or may not have had this collar for the mainstay but it seems reasonable to assume that it would some 34 years later.

The earlier rig used a deadeye with five holes, three on top and two spaced evenly underneath. The ten holes on the plans indicate a stay for the jib sail (Plate Two) set up with the deadeye arrangement. Note that the mainstay does not appear to have been set up in the same way. The illustration is taken from an engraving titled "The Mary and Other Yachts Off Harwich 1761," from the catalog of the Macpherson collection of paintings and prints in 1930, and was also used in Frank C. Bohen's book, *The Sea, Its History and Romance*.

You, like myself, can always bore for the multiple holes later, but for now I would tend to agree with James Lees' evidence and the use of the mainstay collar at the stem.

12

Final Carving Details

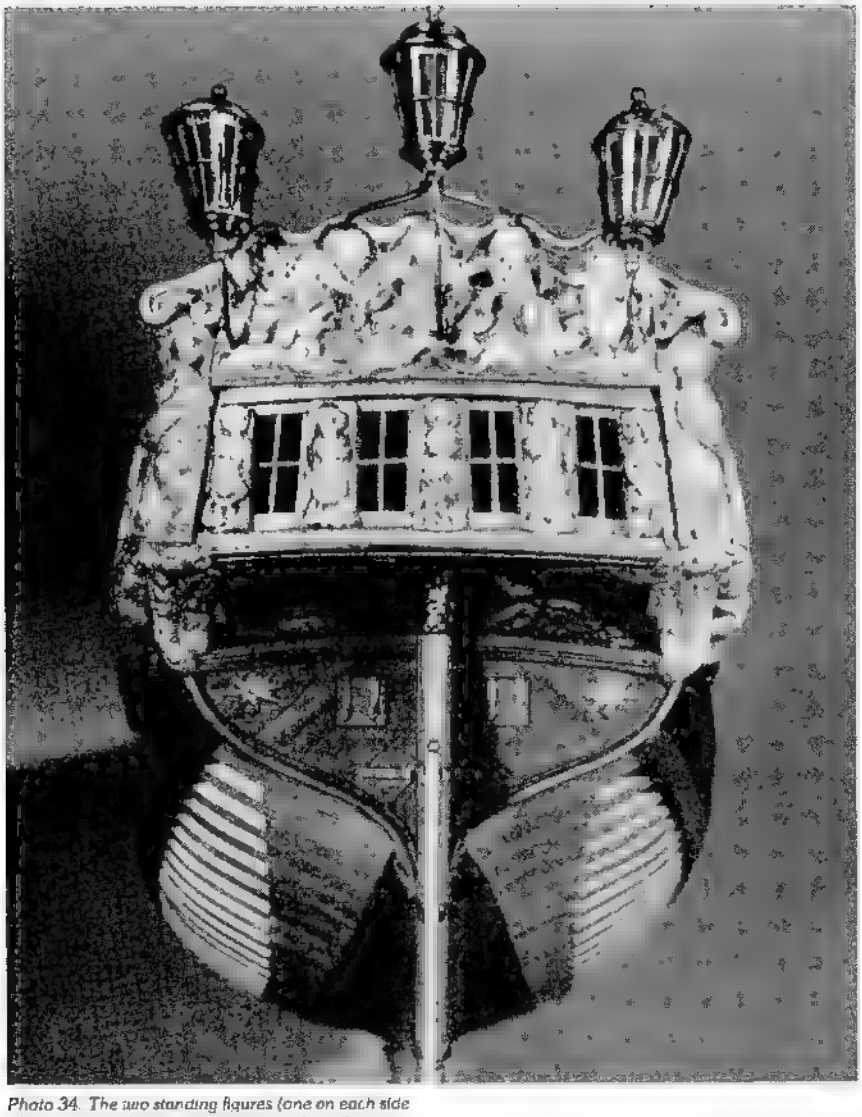


Photo 34. The two standing figures (one on each side of the transom) have an extension on the taffrail over their heads. A smaller scroll lies against the side of the hull. The gap between the two whorls is bridged with a series of small acanthus patterns.

Photo by Deborah Donovan

Completing all the carvings for the stern, quarter galleries, port wreaths, and figurehead took well over two weeks to achieve. The most difficult to visualize and carve was the single standing figure at the side of the transom, primarily because it needs to be done nearly in the round.

Only a small portion of the standing figure touches the side of the hull. I found this even more difficult than the figurehead, with its complex seated figure and winged cherub overhead. Carving in the round requires that the whole figure must work from all angles, including from above. A similar problem exists under the quarter galleries where the supports are the heads of cherubs.

There is a surprising amount of waste material to be removed. In order to do this efficiently, I also used some rotary burrs in the Foredom flexible shaft. I don't advise using the Dremel tool because of the high RPM which tends to burn the hard woods and there are times when slower is better. Three of the most useful burrs to use are as follows: 1/007 round, 6/018 bud, and 17/010 concave. Because each of these are very delicate, it would be wise to get at least six of each. Keep in mind that as the tool works on the wood, so does the wood work against the tool. It will heat it up (a prelude to breakage) and dull it as well, especially if you're using hard woods such as box that also have considerable silicone in their makeup.

Carving the two standing figures at the sides of the hull would complete the stern carvings, leaving only the lanterns to be installed before it could be photographed as you see it in Photo 35. The figure stands on the pedestal, seen earlier.

Over the head of the figure is a scroll carving, really an extension of the taffrail, which is carved separately. It rests on the bonnet of the figure and must, therefore, be made concave on the underside. The figure hugs the hull from the shoulder down and filling the space between i

and the side of the hull are folds of drapery. It appears as though the Greenwich model's figure was handled in exactly this way. There is a twist to the figure which gives prominence to the knee, upper arm, and head that can be used as landmarks for the carver.

However, beginning with the head you will produce a better feeling for the proportions you will be working with. Viewed from the starboard side, the right arm crosses the torso and holds a shield, while the left arm is tucked behind the side of the figure (Photo 36).

Wood stock used for the figure is about 3/8" square. It must be angled at the lower end to fit well on the pedestal and match the slope against the side of the hull. Allow for some extra at the top for the head portion which can be cut back to fit when you're figuring the head's location. It should come about one-third the overall height of the stern carving over the windows.

Stock for the scroll should be as wide as the taffrail. After installation it should appear as one continuous sweep from the rail to above the figure. The portion of the scroll which lies against the hull is another smaller scroll bridged between with a series of small leaf like patterns that are repeated on the upper side of the scroll. Here the leaves branch out from a central stem. The design is routed out leaving a 1/32" border at the top edge after you have first shaped and sanded the curved top surface. Pfingst's® small burrs work extremely well here where you want to achieve definition in a very small area.

If you'd like, you can clear out the underside between the two small scrolls to accommodate the top of the figure's bonnet. Some extra cutting away of both may be needed to get a good fit and to have the scroll seat securely. With the exception of the part that touches the hull, both the figure and the scroll were given an undercoat of ground color prior to gilding. While this was drying, the block for the quarter gallery was cut.

The time had come to permanently install the framed windows of the quarter gallery. These would have to be secure before the block could be properly fitted to the roof and sides of the hull. Both glue and pins were used to secure the frames and these were left overnight to dry for curing of the Titebond. Fitting here is critical and you don't want things going adrift at the last minute (Photo 37).

By the time I had reached the point of carving the side figures, I had decided to switch to boxwood as well as to change the ground color to yellow ochre. The apple wood did not perform well in areas where lineal cuts had to be made across the grain. The lighter ochre underpaint also brightened the look of the gold leaf after application. Here again, a water based model paint was used. The use of the lighter ground color takes care of the problem of missed spots that occur in deeply undercut areas where it is all but impossible to apply the gold leaf successfully. The ochre coloring gives the feeling of greater depth while resembling the gold leaf in shadow. The gold leaf tends to obliterate the detail once it's been applied, as can be seen in Photo 38 illustrating the carvings for the figurehead. Here only the crown is gilded while the other carvings are in their natural wood state.

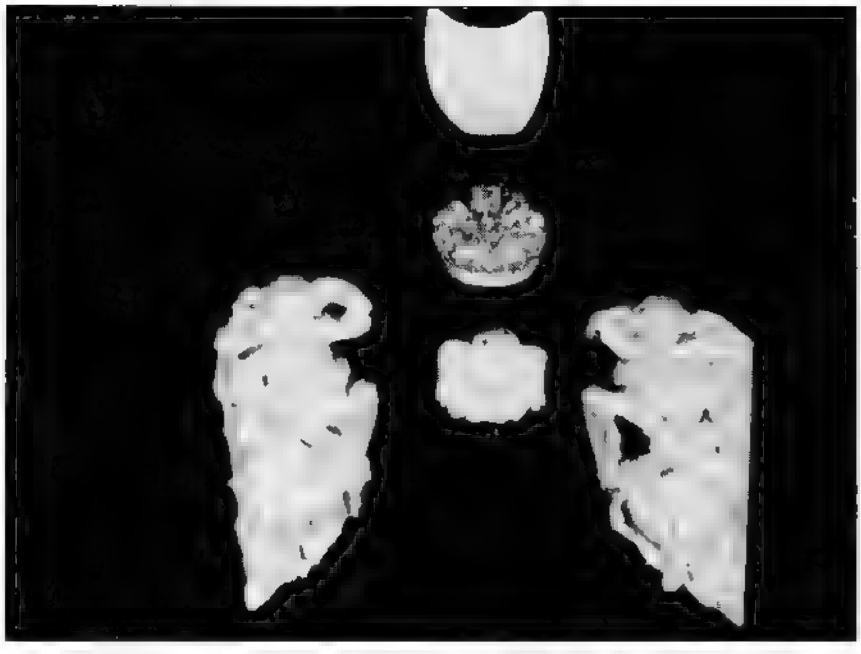


Photo 37. Only the crown is gilded while the other carvings for the figurehead remain in their natural wood state. Flanked by the two side figures (from the top) is the hood, crown and lozenge.

Photo 35. The quarter gallery windows with their elaborate top and side carving ornamentation. You can also see the single standing figure at the side of the transom. The latter proved to be the most difficult to carve. Photos by Deborah Donovan.

With the framework of the quarter galleries secured work on the top, carving could begin. The completed side carvings were pinned into position, and these along with the other components - as completed - were left tacked to the hull until all were finished.

The shape of the carving block is first established on the bottom. The outline of the quarter gallery roof is traced off onto the underside of the block. The height of the block is measured between the lower edge of the moulding at the rail and the roof of the gallery. The depth is measured from the back edge of the roof at its widest point to the front edge of the roof.

The excess wood at the corners (Figure 64, can be cut away following the traced line on the underside. It pays to do the carvings for both sides simultaneously so that they match. The two cherubs seated on each side and holding the pennant, rest against a curved backdrop (Figure 65). The base follows the shape of the roof of the gallery and will provide you with enough extra material to carve the foot which hangs over the edge of the base.

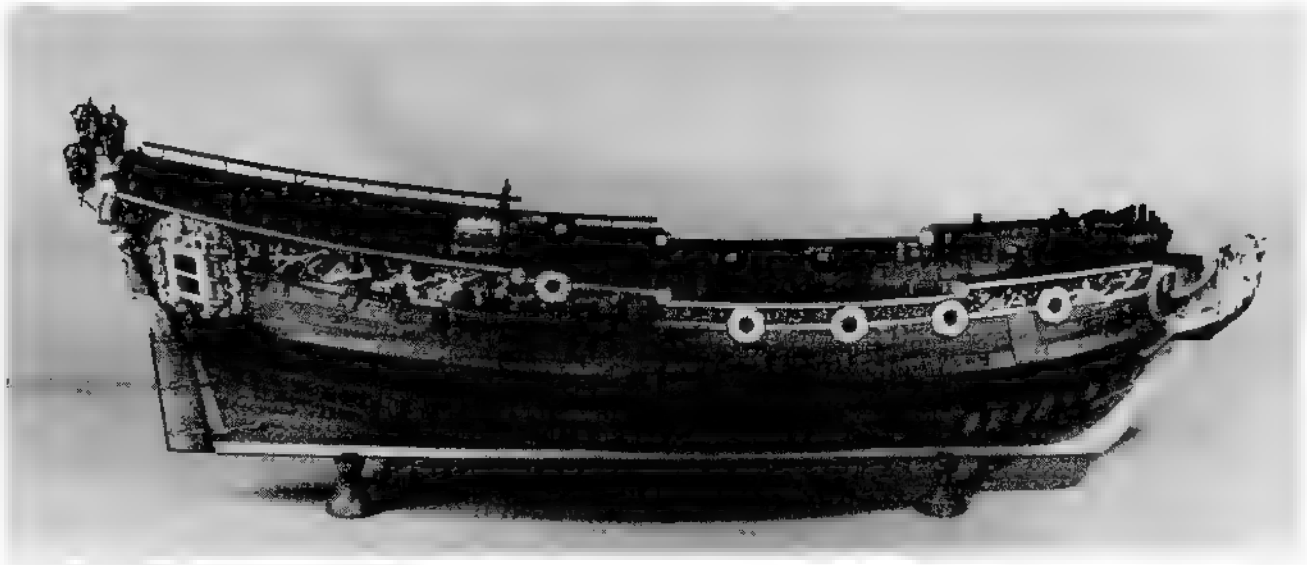


Photo 36 Both port and starboard quarter gallery windows and standing figures at the sides of the transom must be indentical. Port chesstree is the vertical timber abutting the aft side of the second gunport The rigging's access hole is directly aft of the chesstree about halfway down the bulwark The starboard main stoysail holes are barely visible in the frieze ending just before the second gunport wreath At the head, a carved trailboard with a hole for the bowsprit gammoning fits between the upper and lower cheeks. Photo by Deborah Donovan

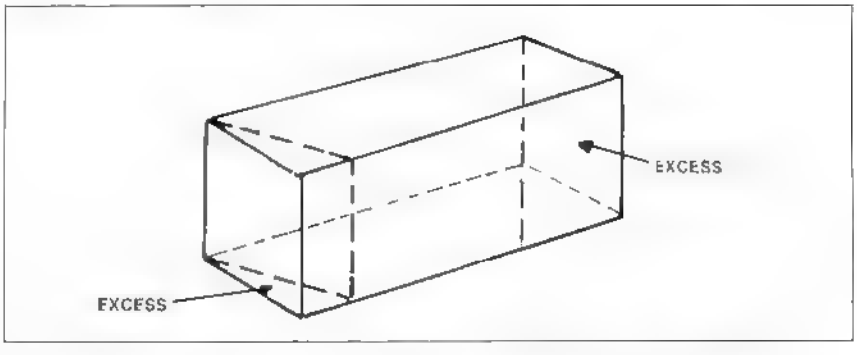


Figure 64

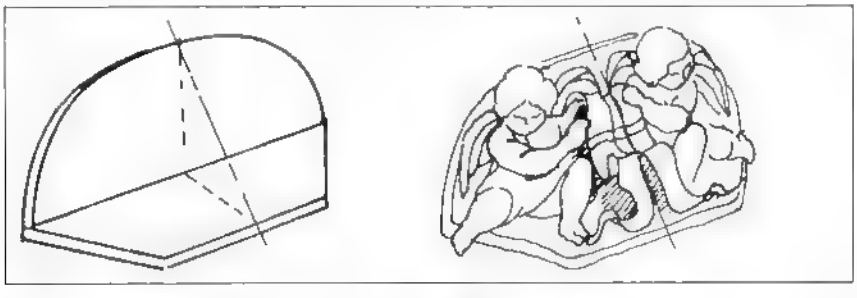


Figure 65

Begin the carving at the middle of the pennant (down the center) Keep in mind that the pennant's two pointed tails separate at the base and drape along the front edge of the carving. The pennant has the design of a cross and you can show a portion of this detail in one of the crosswise folds if you like The stronger emphasis can be on the central line running down the middle by recessing the line and making it about 1/16" wide Undercut between the tails and under the folds to give the appearance of depth. The whole pennant should tip back towards the backdrop. The first fold up from the edge is the marker for the cherub's knee which inclines in towards the center of the pennant

Once the carving is completed, you will have to remove some stock from the back of the piece to get it to sit snugly against the side of the hull. Give the carvings a coat of ground color

Moving on to the underside of the gallery frame, the supports there are done in separate units. A backpiece acts as a brace against the hull, then two cherub heads support the outboard corners of the gallery window. Begin with the brace's outer ends which take the form of scrolls The side cherubs will have to be pinned into position while you work on this section so that the scrolls on them match up with those of the brace. When this section is complete, pin it to the hull and proceed with the heads of the cherubs. Both the neck and part of the shoulder will be seen so these will have to be included. There will be some distortion here because of the perspective. Begin with the head, then work on getting the curve back of the neck portion If your carving needs to fill some

space, you can include the hint of a wing. When these are completed, follow up with the ground color and gilding, then glue and pin into position.

The next bit of carving was the port surrounds. These are best done on a strip of stock about 3/32" thick. Ganging them together allows you to monitor the progress in getting them all to look alike. Lay them out on the stock, first as circles with a second circle representing the opening for the port. Bore this central hole out with a 1/4" drill bit, then enlarge the opening as the carving proceeds. After tracing on the wreath design, start carving at some central point such as the top portion. Take each area separately and repeat for each of the wreaths to maintain uniformity. Again, the back side will have to be cleared away to have the port rings seat well against the hull. The edges of the mouldings will also have to be trimmed to get a good fit.

As I worked my way forward towards the bows and the figurehead, I decided to complete the carving at the fo'c's'le (Photo 39). The ends of this carving lap over the rail at the side. A railing which feathers out to the outer edge of the fo'c's'le rail covers the carving. The railing and its six timberheads are painted black. I pre-bent the rail and beaded moulding at the base of the carving before installation, then pinned and glued them into place.

At the same time, two chesstrees needed to be carved. The port one is seen inboard on Photo 37 at the main deck, just aft of the second gunport at the junction of the forecastle's hance. Begin by boring through the hull with a 1/16" bit, then insert a short length of brass tubing for a sleeve. The chesstree is carved in the form of a standing torso. Its head is above the 1/16" diameter opening and is free of the hull so that the line coming inboard through the hole can be belayed there.

I also decided to make open ladder ways leading to the poop deck. It seemed they would not have covered the windows in the bulkhead with a solid stairway and so I opted for this alternative. I also had second thoughts about gilding the inboard side of the hances. The final results were more pleasing and I'm now glad I gilded them.

The bow carvings begin with the trailboard that runs straight back to the hull. This is a simple lattice design with an opening for the gammoning rope. Making it fit between the upper and lower cheeks is made easier if you first cut a paper pattern.

Between the two side carvings sits the crown (seen in Photo 38). To make room for it, the figure block must be cut down as in Figure 66 prior to any of the carving. The block's lower front edge acts as a support for the lozenge that bridges the gap between the two side carvings (Photo 39).

As a protection to the multiple head carvings, a curved hood is used. See Photo 38 for its shape. It also can be seen under the bowsprit in Photo 39. This may also have been a place on which to stand, since the crown is left uncovered, but is directly under the bowsprit. The cross at the top of the crown just clears the under side of the sprit. Lateral support for the crown is supplied by the formost wings of the cherubs. Their outstretched arms support the upper portion of the lozenge.

As complicated as this group of figures appears to be, I can tell you they are less difficult than any other on the hull. Perhaps because they are only about an inch and a half overall. Again, the burrs were of tremendous help here. The stock

Photo 38. Carvings at the fo'c's'le. Note the top of the curved hood which protects the multiple head carvings. It's visible directly under the bowsprit. The port and starboard chesstrees look as if they are located directly beneath the hances of the fo'c's'le due to foreshortening. *Photo by Deborah Donovan*

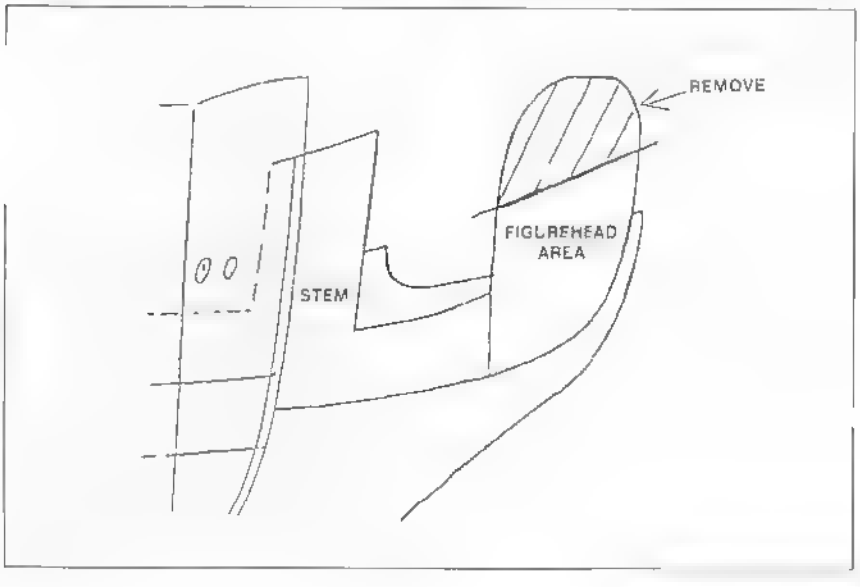


Figure 66

for this group was 3/16" thick and this time I worked from the bottom up.

I first cut the block to fit the upward curve of the cheek. The lowest point is the toe of the seated figure. The inboard side is a straight cut. Along that edge is a series of small scrolls. The seated figure occupies slightly more than 2/3rds the overall height of the group.

The section between the outstretched arms holding the shield and the torso is completely cleared out, revealing a hint of the same blue background color used in the painted areas. The Greenwich model has this blue painted on the stem from the waterline up to the lozenge at the front. The central portion of the lozenge is painted an antique white and glazed with a clear varnish. The letters GR are put on in gold. I used the Godmark® transfer sheet to do this. The results are better than using gold paint and is in better harmony with the rest of the gold leafing. The frame surrounding needs to be cleared some so that it sits well on the stem and rests just behind the upper part of the shield.

The crown was next and the most fun to make. It's about 1/2" in diameter and about 1/4" high overall. The source for the design of this crown came from Charles Hasler's wonderful book, *The Royal Arms*. It was also the source for the letters GR used on the lozenge (Figure 67). The upper portion of the crown is divided into units of four. The four arches support the cross at the top.

At the base of these arches and resting on the upper rim of the headband is another cross. Between the arches at the rim is a fleur de lis. Between the upper and lower rim of the headband and below the crosses and fleur de lis are raised jewels. My "jewels" are simply round raised beads made using the concave cutter burr.

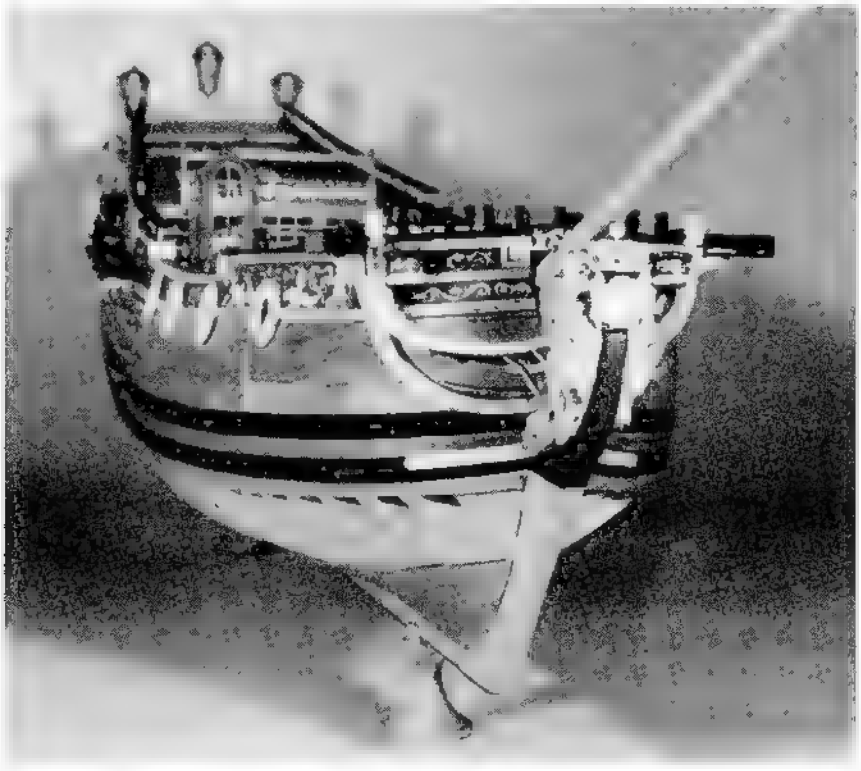


Photo 39. The four separate figurehead units assembled in position. The top cross on the crown is clearly evident. Photo by Deborah Donovan

Figure 67

The cross at the top was cut from 1/32" thick sheet brass, then lacquered to preserve the finish. The shape was first scribed onto the brass, then the first cuts separating the four points of the cross were made with a fine jeweler's saw. At the bottom of the cross I filed a pin that could be inserted into the top of the crown. Next, the four points of the cross were faceted with a super fine needle file, then polished and lacquered.

To be certain of symmetry, I turned down an oversized length of boxwood on the lathe including the maximum diameter of the crown's upper portion, circlet, and beading.

Next, saw cuts were made at the top of the crown for the arches, and the center bored out for the pin on the cross. Once the arches were blocked out, carving began on the design — all under the magnifing glass. Fitting the crown was done by removing stock from its base at the back of the cherub's inboard side.

Cutting the hood section begins with a paper pattern that will fit between the two side figures to the juncture of the knee connecting the two upper head rails. You might want to use some heavier card stock for this pattern. You can see the general shape of this piece in Photo 38. The outboard edges are beveled to rest on the cherub wings. It's interesting to see how all these various sections are interdependent and work to support each other. The fore edge of the hood fits around the upper part of the crown, giving it support from behind.

Some 1/4" thick stock is needed for the hood. After you have traced the general outline onto the upper face, begin to cut the bevel at the back lower end before trying to cut the outline. You'll have to bevel and curve the underside in stages — and cut away the front portion as you work. There is no simple way to do this, but one step at a time. I tried cutting the outline first and can tell you this usual procedure doesn't work because of the strange upper and lower surface curves. So, start at the bottom and work towards getting the fit on the underside and at the headrails and crown before shaping the top.

Once the lower part is fitting well, you can mark the sides of the piece so that it will follow the upper edge of the cherubs wings. There is a crown to the piece so you must work from the center line of the unit out to the edges, a little at a time. The outboard edges will be paper thin where they meet the carvings and should appear as one continuous unit — not heavy and thick. I gave the finished piece a coat of ground color and then installed it on the hull. It had to be hand held for some time under pressure until the adhesive set. Such rough treatment would have marred the gold leaf so this was applied afterward.

Excluding rigging, the hull is complete.

13

Making Deadeyes

All that remains to complete FUBBS' hull is the installation of the deadeyes and chainplates. Once these have been made, they can be put into place and the mouldings which cover the openings in the channels can be pinned and glued into position.

There are dozens of deadeyes to make, so a way must be found to produce them efficiently with consistant results. Past experience has taught me that the best material to use for deadeyes is phenolic rod. Two sizes are required: those for the channel shrouds, and smaller ones at the topmast shrouds. I used 3/16" and 1/8" diameter rod on the model. The main advantage to this material is that it holds up under the heat created by the friction of turning. It takes a fine polish and looks like ebony without any of the problems associated with that wood.

The first step is to make a fixture that will be used to drill the holes in the face of the deadeye prior to shaping. The position of the holes on the face of the deadeye is governed by the rule shown in Figure 68. Brass tubing and sheet are used to make the fixture seen in Photo 40. Because of the two sizes required for the deadeyes, you'll have to make two fixtures. The brass tubing should be an easy push fit over the end of the phenolic rod. To scribe the concentric circles for the holes, first take a scrap of thin brass sheet and lightly mark a center using a stout darning needle. Take care not to distort the surface of the brass sheet with too heavy a blow from the hammer. You just want the pin of a compass divider to seat in the indent to keep it from sliding around.

Next, scribe center lines using the indent as a guide. Mark the position of the holes, then give these a light tap — again using the darning needle as a punch. The larger deadeyes will take a #60 drill bit and the small a #72. After drilling the holes, trim the excess brass and file to slightly beyond the scribed line. The brass sheet will be silver soldered to the end of the tubing. If you have the tools, scribe a second circle beyond the larger one for the thickness of the tub's wall, otherwise, you will have to judge by eye.

Cut a short 3/8" length of the tubing, clean the edges well, then place it on top of the sheet portion. Tack solder the two

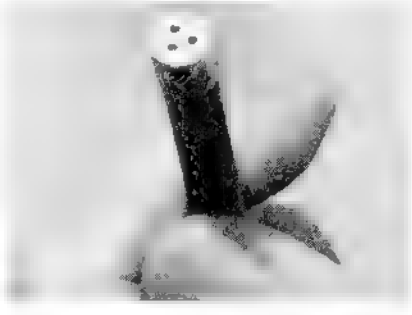
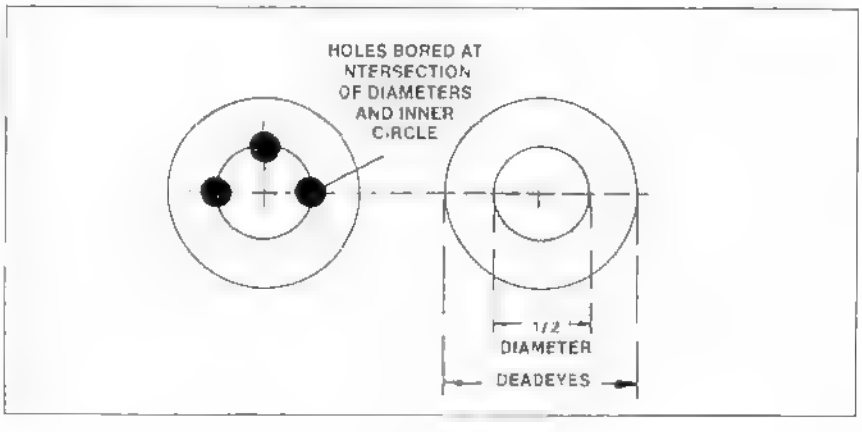


Photo 40. The fixture for making deadeyes. The brass tubing is an easy fit over the end of a phenolic rod. A brass sheet is silver soldered to it, after drilling the holes. *Photo by Deborah Donovan*

and, after they've cooled, check for alignment by inserting the rod and boring some test holes. If it's okay, wire it up with iron baling wire and resolder the entire unit. Be sure to use sufficient flux, but go easy on the solder so it won't clog the holes or leave lumps inside.

Now chuck the rod into the lathe. First, true up the end by making a square cut

Figure 68



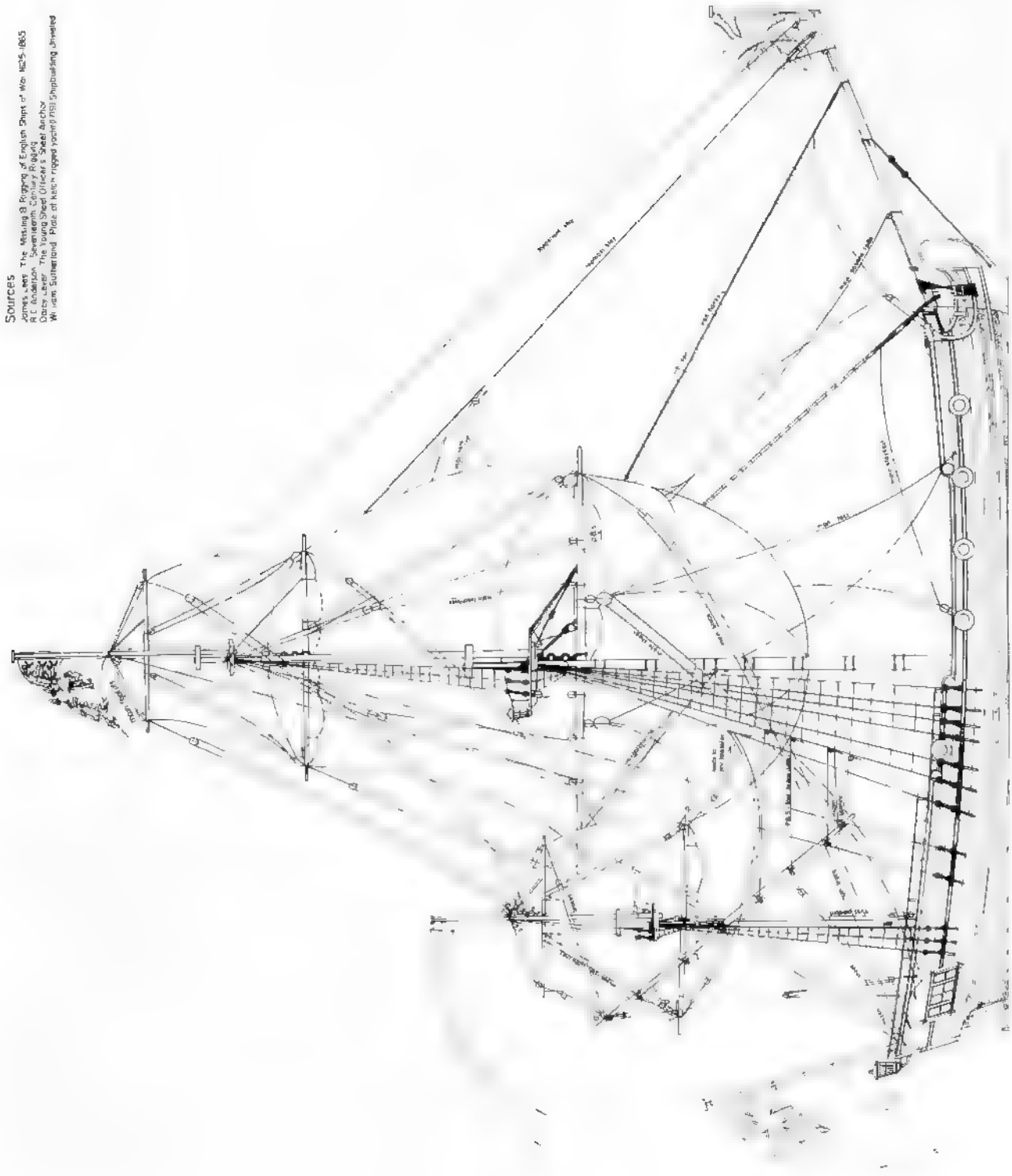

Sources
James Lees The Masting & Rigging of English Ships of War 1625-1868
R.C. Anderson Seventeenth Century Rigging
Darcy Lever The Young Sheet Officer's Sheet Anchor
William Sutherland Plate of Ketch rigged yacht in Pilot Shipbuilding Unveiled

Plate Three. HMY FUBBS sail and rigging plan

across it, then slip on the fixture. A flexible shaft tool is very handy for drilling these holes. Drill only to a depth of about 1/4" This will be deep enough to pass through the deadeye to be formed and at the same time will mark the position for the next one to be drilled. The outer face of the deadeye can be shaped with a small flat warding file This is the type sold in automotive parts stores, but they may also be available in good hardware stores. They're about 1/2" wide, 4" long, and 1/32" thick. Warding files are little gems and terrific work horses!

Once you've completed shaping the slightly concave face of the deadeye, it should be polished with "fine finishing film sandpaper I found even the finest wet or dry paper left scratches Polishing is done while the lathe is turning

Next, the groove is cut for the strap that holds the deadeye to the chainplate These grooves are smaller than those for the shrouds About 1/32" rod is used for these straps, and about 3/64ths for the shrouds. This makes the shroud deadeyes slightly thicker than those at the channels

The groove is cut with a knife needle file, then the back face of the deadeye is shaped again using the knife file. Before the deadeye is parted off, it's given a light polishing. This can be tricky, but if you fold the finishing film and use a light touch, you can do a fair job of it. Parting off is done with a razor saw, then the deadeye is polished once more at the cut off point You'll need a total of 30 large deadeyes, two of which are used at the bobstay (Plate Three)

Although it seems a long and involved process, the actual doing takes but a few minutes and all 30 could be done in about three hours. It pays to make a few extra to make up for those that manage to fly away Each of the holes bored need scoring at the top. This is best done with a small round ball burr. A light touch is all that's needed here followed by another light polishing

While on the subject of turnings, I should mention the possibility of blockmaking on the lathe. Rectangular stock is needed the length and width of the block to be turned up In the case of those shown in Photo 41, boxwood was used, but lemon works as well. The important thing is to use a dense hard wood, otherwise, the heat from the friction of turning will make the smallest of these disintegrate In the photograph you can see that a portion of the stock, as well as the tip of the finished block ready for parting off show traces of the turning process

The width of the block is marked out on the stock along with the opening for the sheave. These must be pre-bored prior to the turning and cleaned up later after the block has been cut away from the stock A combination of filing and sanding shapes the faces of the block after a score to mark the boundary for the cut off has been made with the knife file. Marking the boundary also gives the block its oval shape at the cut off. This process is then repeated on the outboard end I used a #11 blade to part the block from the stock. Again, all this takes more time to describe than to actually do. You'll find you can turn out a vast number of these in an afternoon

The block will still need to have a score cut in for the strap. This step can be partially done at the beginning when you are marking the stock for the cut off and opening for the sheave. The end top and bottom can be lightly scored with a knife file at the center line

A portion of this score will remain after the block has been turned to give you a start once the block has been parted off Either commercial sheaves or ones you make yourself are used and depending on the size of the block, a lill pin can be used to secure the sheave in its opening provided that you file down the head of the pin On very small blocks it's better to use fine wire and to form the head by

Photo 41 Blocks and deadeyes under construction and in their finished form as. Note that the sheave has been inserted while the block is still attached to the stock. Photos by Deborah Donovan

Photo 42 Deadeye chains anchor directly against the hull There are no backing links

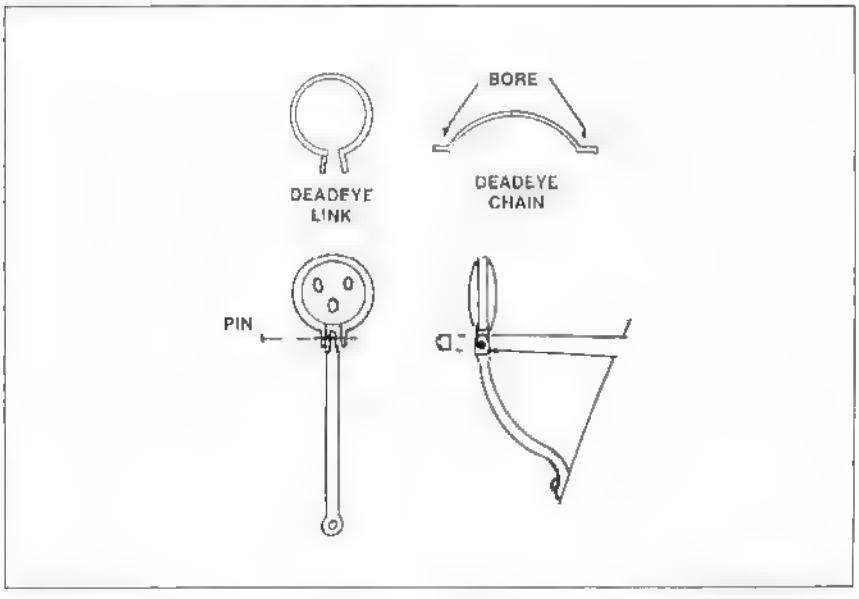


Figure 69

cutting the wire overly long, then gently filing down the burr that protrudes.

The wire forming the bight and hook on the blocks seen in the photo was not softened because the blocks are used to carry the weight of the anchors. Some softening could be used if the anchors are stored in the chains, but at the time these blocks were made I was not sure what I would do with them

The bight is formed first by giving it one twist, then flattening it some on the anvil. The wire is then fitted on the block and marked at the point where the pin will be inserted. Here the wire must be flattened again so that a hole can be bored through it. Gentle tapping on the anvil, using the tip of a 1/32" nail punch laid on its side, worked well. You have to reverse the wire and tap from the other side as well to keep the wire laying flat

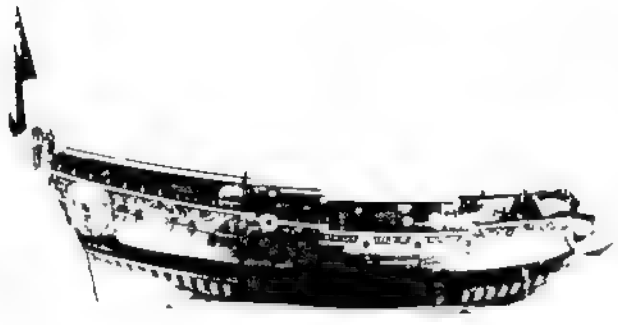
With that done, the wire is again placed on the block and the two ends brought down under the block and crossed One leg is nipped off and the other will form the hook. Remove the one wire and form the hook by tapping once again on the anvil. Before returning the wire strap to the block, the joints at the bight and hook are pre-tinned with the silver solder so that very little heat is required to join the parts This avoids the problem of burning the wood block.

Deadeye links and chains are very simple assemblies (Figure 69). The strap for the deadeye is cut from 1/32" round brass wire. Measuring the length is done by bringing the wire down around the deadeye and pinching it at the bottom Two tabs are formed by snipping off the ends and flattening them on the anvil, then boring through their centers with a #72 drill bit

The rod portion must be softened for bending and soldering. The upper end was done first I used 3/64" diameter brass rod and took off almost 1/64" from both sides to form a landing for the taps of the deadeye strap. The lower portion is curved as shown in the figure, and have a tab formed at the end, again by tapping. Try the piece in the channel before going on to the next. When the proper length has been achieved, restraighten the rod and cut the number required for the main channel. As you move aft, these rods are shortened because of the smaller channels and deadeyes

Pre tin the strap and the rod before setting up your deadeye inside the straps Lill pins can be used to secure the straps, but file the ends flush with the tab of the strap so that it seats well in the slot made in the channe. At the lower end, use small brass headed nails to secure the rod to the hull. These do not have backing links according to the Greenwich model, but are secured directly to the hull (Photo 42). The mouldings which cover the rod chains are not gilded on the Greenwich model and so were left natural on mine Once all the deadeyes are complete and fitted with their chains, the mouldings are pinned and glued into position. This now completes the hull and all its fittings.

14



Modeling Flags & Anchors

The chalenge of modeling a period vessel doesn't stop with construction of the hull and rigging. It extends, as well, to making the flags and pennants for that final flurish. Perhaps the most difficult job is finding the proper medium with which to execute the designs without sacrificing the detail.

On FUBBS the most detailed flag of all was the Royal Standard (Figure 70) With that in mind, I went in search of a fabric that would answer the problem What I found was a polyester taffeta with a dull sheen and weave Too much gloss would appear garish something you must avoid at all costs. I bought a quarter of a yard of fabric to give me some margin for mistakes. Since the majority of the flag's background color was red and painting it would have stiffened the fabric too much, I chose red taffeta

My source for designs came from W G Perrin's book, *British Flags*, published by Cambridge University Press, 1922. Fortunately, the illustrations are in full color and those elements which are gold are shown as such. The gold shown on the Royal Standard is in light touches and, at our scale, are even more so. Gold paint simply won't do for these areas because it builds up too heavily. The best medium is again the Gold Mark leaf which goes on delicately, depending upon the tool used to transfer the gold. A well sharpened 4H pencil is ideal for this job.

First however, tracings have to be made for each of the flags and the pendant designs. Be sure to include on these tracings an extra 1/8" for turnback at the edge that is fixed to the poles Plan to trim the flags after they have been painted to assure a clean edge. When you trim them use a single edge razor blade. This is particularly important in the case of the swallow tailed pendant, any snag in the cutting could ruin it.

Remember that the designs have to appear on both sides of each of the flags

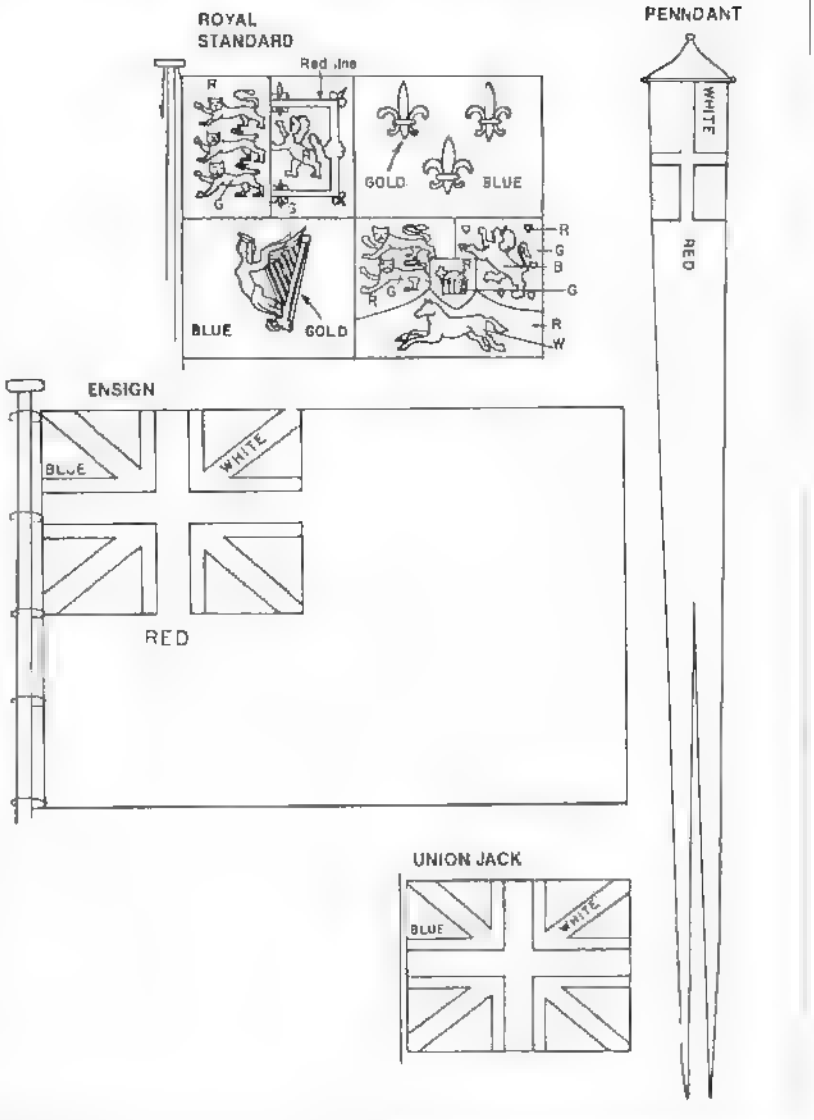


Figure 70

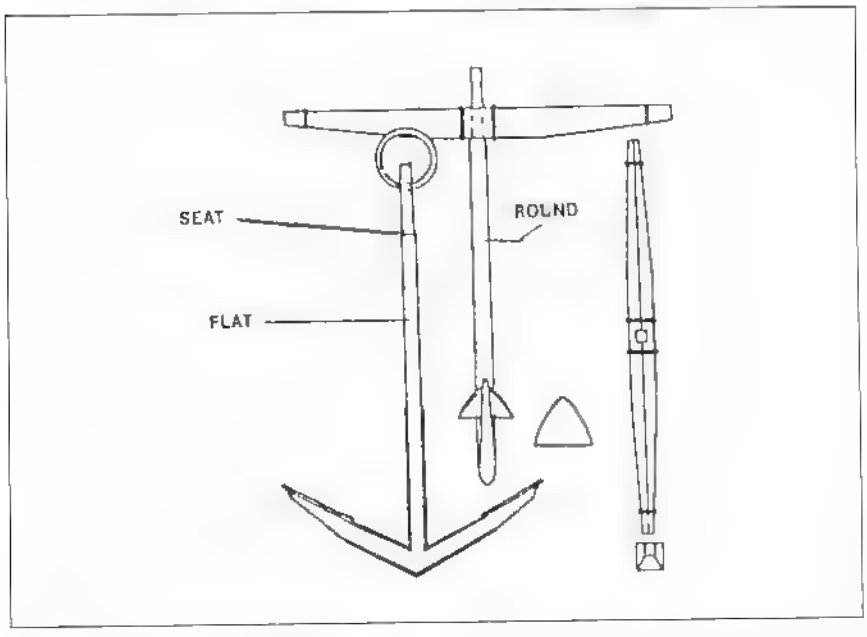


Figure 71

Treat the flags as though they were transparent, i.e., the reverse of the pattern must be used on the opposite side. Take into account the grain, or weave, of the material you are using.

My taffeta has a barely visible fine ribbed texture which is extremely helpful when painting the straight edges of the designs. The weave should run vertically with the exception of the pennant where the rub will follow the direction of the pennant.

Cut your pieces of fabric with a large enough border to allow the scraps to be taped down on a piece of cardboard. Lightly pencil in the reverse of each tracing to act as a carbon. Use a #2 pencil for the carbon side, but transfer the design with a well-sharpened 4H pencil. Some of your lines may have to be darkened in order to see them well. With the exception of those areas done in Gold Mark, the remaining designs were painted with acrylic water based paint. In addition, yellow ochre was used as a base in those areas receiving the Gold Mark, to brighten the gold leaf when it was applied. Acrylic paints dry rapidly and the polyester fabric seemed to accelerate this.

Selecting the proper brush for the job is crucial. Contrary to what you might suppose, a #3 round sable brush worked best. I found that paint would dry on a smaller brush before it reached the fabric, but the larger bristles hold the acrylic in its liquid state for a longer period. Be sure to mix some liquid detergent in the rinse water for your brush. It makes the paint flow more easily and does a better job of cleaning the bristles.

Begin with the lightest colors working towards the darker ones. Getting the flag to hang realistically was accomplished by applying weight to the lower end and then spraying the flag with matte fixative. After it was dry, the weights were removed and the result is what you see. Don't be alarmed when the fabric darkens after spraying. It will return to its normal color after it has dried.

The Royal Standard is flown from the top of the main mast. Below it, at the top mast head, is the position for the pendant. The jackstay carries the smaller Union Jack at the outer end of the bowsprit.

Fashioning the anchors almost completes the ironwork on the model if you choose to make the railings in the tops from brass rather than wood. For the anchors you'll need some 5/65" round brass rod, and 1/8" round rod sheet brass 1/32" thick is used for the palms.

The shank is tapered its full length by flattening the front and back of the shank from the base to the upper end. At the top of the shank, the sides are squared off for 3/8". Approximately one third up from the bottom to the shoulder, the shank is first turned 90°, then squared off again. A hole is bored for the anchor's ring at the top of the shank.

For the time being, leave the lower end alone until you have shaped the arms of the crown. The 1/8" round brass rod is used here. The front and back of the arms are flattened in the same manner as the shank. At the outer ends, the tips which hold the palms or flukes are given a slight taper on the underside. On the upper side, the arm is flattened for the flukes. The end of the arm has a small point that protrudes beyond the tip of the fluke.

Begin making the crown by cutting a length of stock a little oversized. Mark the center, then make a "V" cut with the jeweler's saw and a fine blade. Don't cut all the way through. This portion should first be heat treated both for ease of soldering and cutting. Pre-tin the cut you've just made, then gently bend the two arms upward to close the V-joint. It should be a perfect match. Now the arms can be measured and cut to their correct length and shaped. The flattened portion for the flukes should also be pre-tinned.

Next, mark off the length of the shank to where it meets the V-section of the crown and cut its correct length. Scribe the "V" at the joint of the crown onto the end of the shank, clamp the shank in the vise, and file flat. Repeat for the other side. Pre-tin the end, then place the shank and crown in alignment and solder the joint. Next, cut and shape the flukes and pre-tin the underside.

Clamp the crown in the vise with one arm extended beyond the jaws. The vise will act as a heat sink, but unless you also arrange to include the shank and crown joint in the jaws of the vise, this joint might come adrift. Allow the fluke to cool before removing it from the jaws, then, repeat for the opposite side.

Next, make the anchor ring by bending some wire around a 1/4" dowel and cut with the jeweler's saw. Insert it into the hole at the top of the shank and solder shut. Give the anchor a good cleaning and then spray paint it black. A nice touch at the ring of the anchor is a puddening worked around its perimeter. If the pattern is too difficult at this scale, just some fine silk thread wound around it will still give the illusion that something is there.

The anchor's stock is made from two pieces of wood. I used some lignum Vitae for those on FUBBS, but any hard wood will do. The two sections are tapered at the outer arms on the underside, and front and back. At the center, a square score is taken out to receive the upper portion of the shank. Iron hoops bind the two sections together. These hoops should fit snugly and can be made from square brass stock.

If you find it difficult to locate square

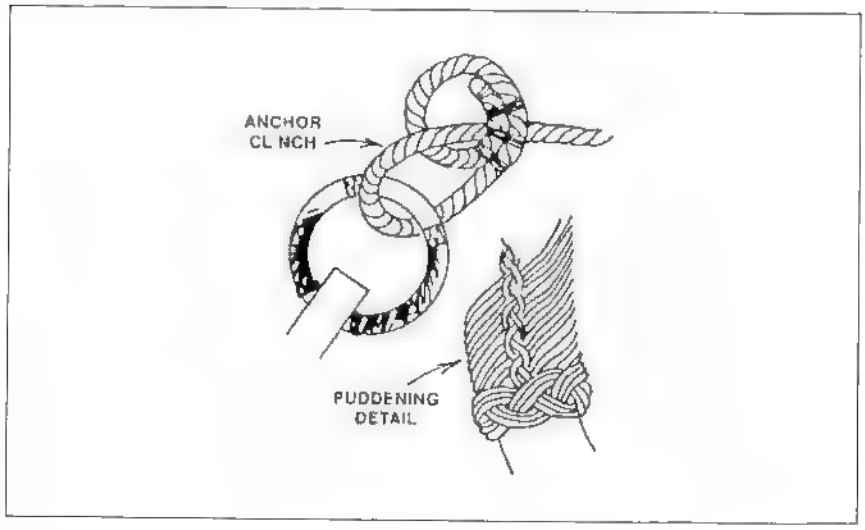


Figure 72

material, you can use round instead. In that event, score the areas where the bands will sit so that you can "bury" a portion of the round wire, then file the upper surface flat with a fine needle file. The joints for these hoops should be soldered shut because glue simply will not hold against the stress of expanding and contracting wood. The bands are painted black after installation. The completed anchors can be bent to their cables as shown in Figure 72.

15

Discrepancies Revealed

Research on early vessels often uncovers conflicting evidence that the modeler must sort through and make decisions about as the work progresses on the model. The lingering doubts that still persist can be warning signs urging you to look further for information but, even then, the answers found may still be misleading.

During one of these excercises into the rigging of FUBBS, I encountered a curious note in the references at the back of Gavin's book, *Royal Yachts*, page 329, under references for chapter X. It reads as follows: "FUBBS in 1710 speaks of striking yards and topmasts, March 26, 1721 — carried away our flying jibboom."

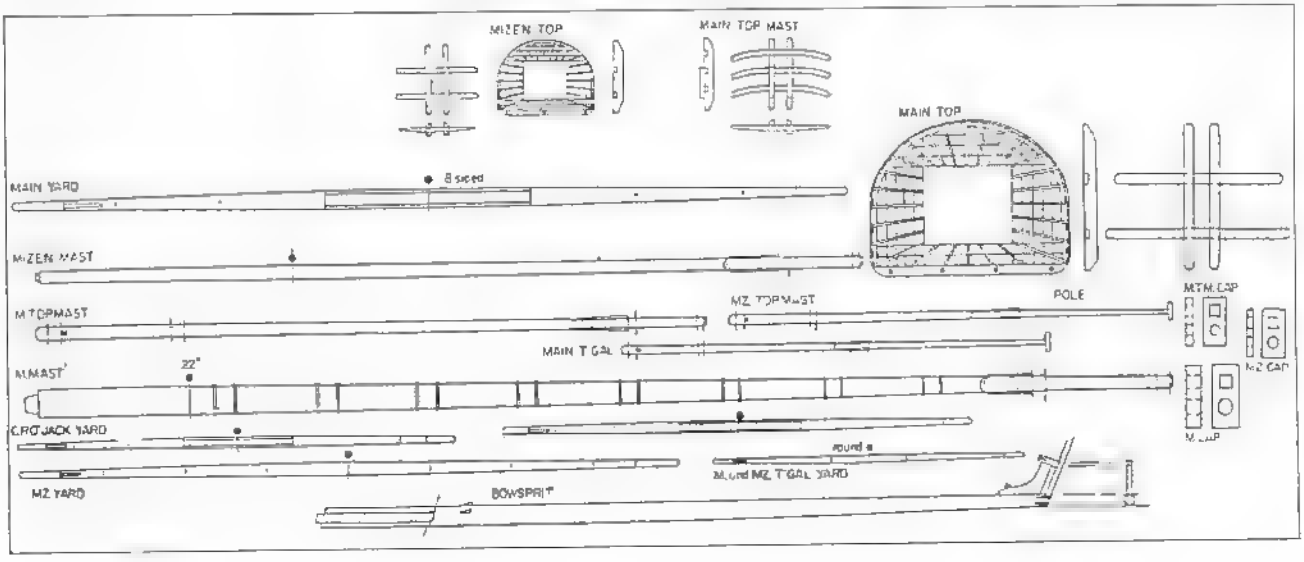
This was the first reference that I had seen calling for a jibboom, let alone a flying jibboom. Sutherland does not list a jibboom in his list of spars for a ketch, but does show a jibsail on his Plate A Yacht or Pleasure Boat (Plate Four).

Although Donald McNarry's model of FUBBS does not carry sails, he, too, has followed Sutherland's lead and brought the jibstay down from the head of the fore mast to a point along the bowsprit. This leads me to believe that if FUBBS did carry a jibsail this might have been termed a flying jib at that period.

James Lees tells us in his book, *The Masting and Rigging of English Ships of War 1625-1860*, that the jibboom passed between the stays that lead through the bees on the bowsprit. There is no evidence of the bees on the Sutherland plate although Lees says these appeared in small ships around 1700. On the other hand R.C. Anderson speaks of the jibboom being lashed either to the side or underneath the bowsprit as early as 1705. This spar then carried the "flying jibsail," not set on a stay but rather carried between the fore topmasthead and the end of the jibboom.

Going back to Gavin, he remarks that FUBBS probably carried the flying jibboom and most likely studding sails as well. Lees states that the first issue of flying jibbooms was 1794. As good as Gavin's book is in some areas, I would tend to rely more heavily on Anderson and Lees for support.

Figure 73.



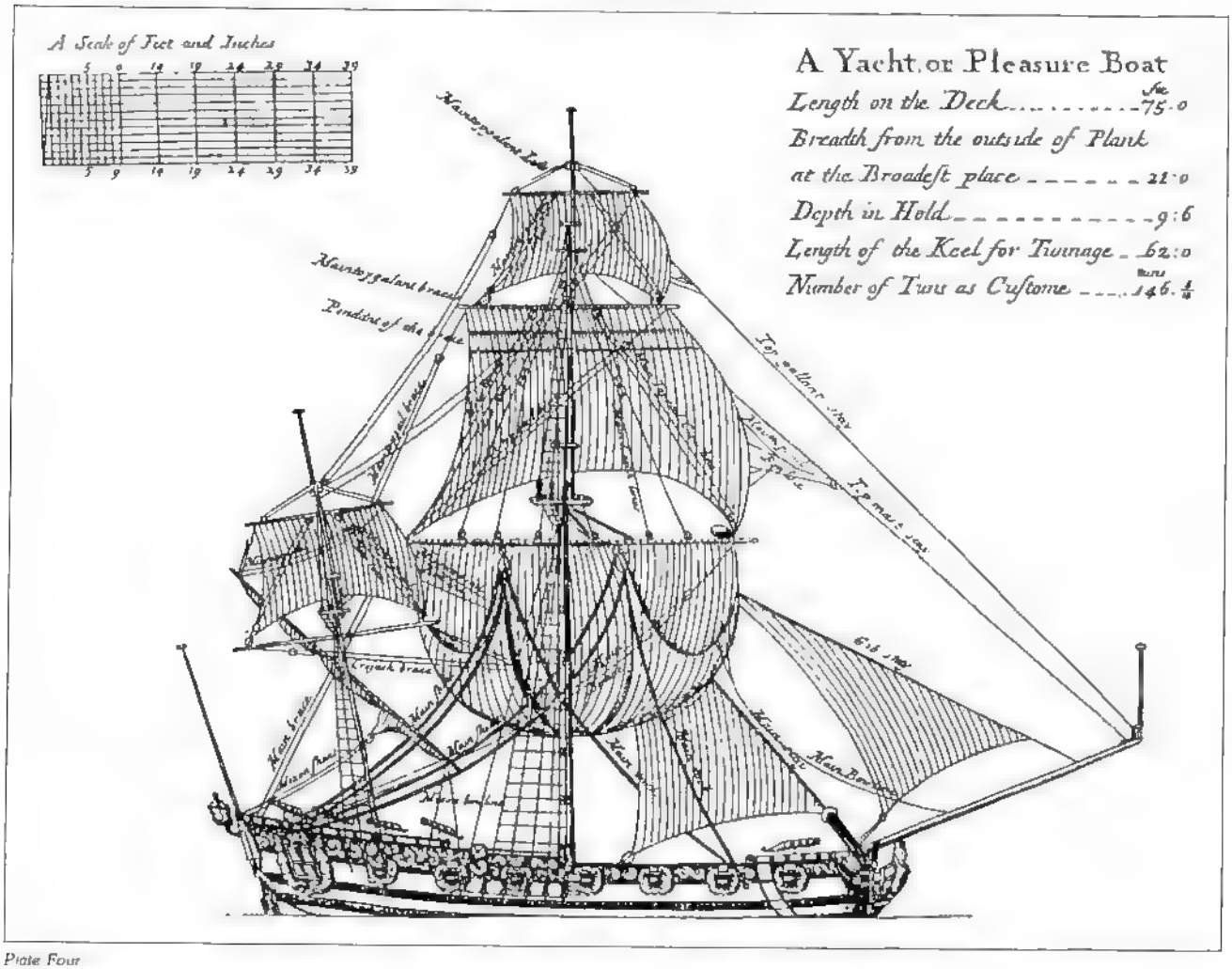

A Scale of Feet and Inches
A Yacht or Pleasure Boat
Length on the Deck 75:0
Breadth from the outside of Plank at the Broadest place 21:0
Depth in Hold 9:6
Length of the Keel for Tunnage .. 62:0
Number of Tuns as Custome 146 4/5

Plate Four

of rigging details, in spite of the log entry referred to by Gavin. The fact that Sutherland did not include the jibbooms at all might mean they were auxiliary spars used occasionally and for that reason I have not included them in the spar plan (Figure 73)

Another omitted spar was the spritsail yard Larger yachts of the period were ship rigged as were later ones, but these were much larger than FUBBS, who measured 61′ BP. CAROLINA, built in 1701 and 71′ between perpendiculars, is an example of a large yacht of the period using the spritsail yard. All other smaller yachts appear to have been rigged without it. Although McNarry does show this spar, I wish I could feel as comfortable with it as he does

A small booklet published in 1941 (Photo 46) shows a painting by Jan Griffer of "Yachts off Greenwich" (1645-1718) The ketch rigged yacht at the right shows a loose footed jib sail brought down to the bowsprit, Sutherland fashion, and with no evidence of a jibboom. Similarly, another painting of about the same period (Photo 74) done by Wm Van de Velde the Elder depicts the yacht FUBBS firing a salute shows this same feature, but neither show the spritsail yard.

Adding to the confusion over what spars may have been carried both before and after the refit of FUBBS, is he log entry referred to by Gavin: "March 26, 1721 — carried away our flying jibboom; November 11 1721 — At sea, owing to the stress of weather and ship expected to founder, they threw overboard guns, studdingsail booms, two mainsails, studdingsail, yards, etc."

Sutherland's proportions for the masts and spars of a ketch do not include mention of studdingsail booms or yards, but yet again these auxiliary spars may not have been listed generally, leaving only the major spars listed in the tables The time lapse between actual practice and the publication of information can be considerable, and may account for the absence of references to these additional spars, however Sutherland does cover the proportions of the studdingsails in his discussion on sail area

It can be assumed that both Lees and Anderson had access to the models at Greenwich, and the great store of information at the public records office so the question of why neither picked up the existence of jibbooms at that early period seems impossible to answer. It may be because they both concentrated on much larger vessels, perhaps explaining Lees' date of 1794 for the official issue of the jibboom

During the course of building FUBBS another point was raised in the Sutherland plate of the yacht, and that was the location of the chesstrees inboard. The main tack is brought inboard through a hole in the side of the hull between the first and second port foreward on the Sutherland plate. This would have been an impossible lead on the refit 1724 because it would have conflicted with the windlass. The plate showing the rigging and sail plan for the FUBBS in Chapter 13 was based on the Sutherland plate and has the opening in the hull in this same position It should be moved just aft of the second port opening. This change on the plans of FUBBS will be made, but for those of you already working on the model, you should make note of this change

As much as I would have enjoyed rigging the model of FUBBS, I will never get the opportunity because I sold it to a collector before that stage in the building had been completed

Photo 43 "Yachts Off Greenwich" by Jan Griffier (1645-1718)

Photo 44 FUBBS firing a salute in an 1684 painting by William Van de Velde the Elder

16

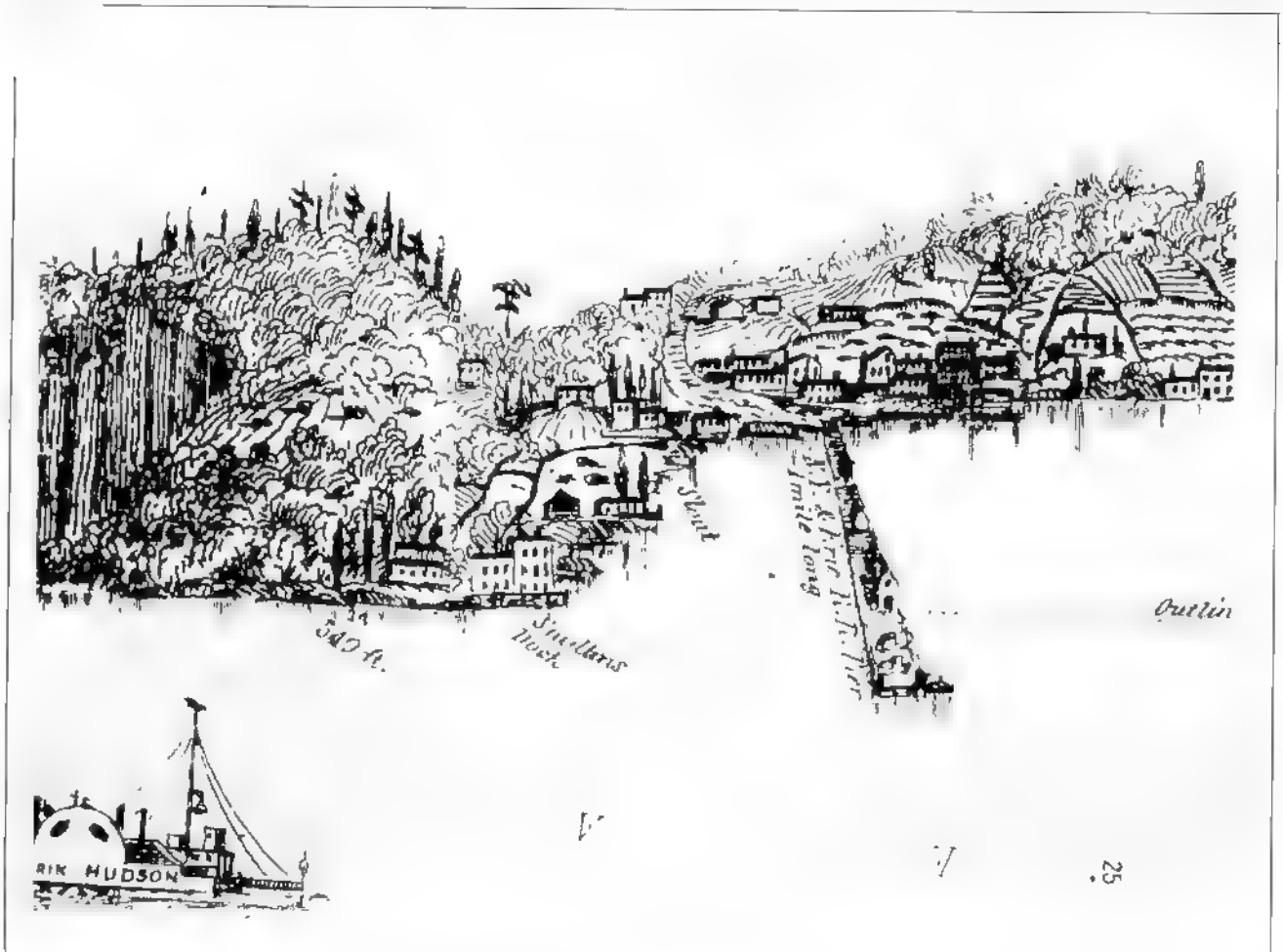
The Research

"The Hudson River Sloop Victorine"

It is believed that the classic Hudson River sloops of the 19th century evolved from the original Dutch sloops that brought the first settlers to these shores. Like their predecessors, these sloops were ideally suited to navigating the shallow streams and inlets throughout the length of the Hudson. Their broad beam and fine sailing qualities enabled them to survive well into the late 1800's, despite the increasing competition with steam.

There are many regional types of vessels throughout the United States, but not all are known world wide. Fewer still are famous for their own sake and because of this, they become a legend

Figure 1. From: Wade & Croome 1846. The panoramic view of the Hudson River West Bank. Piermont, New York. Author's Collection



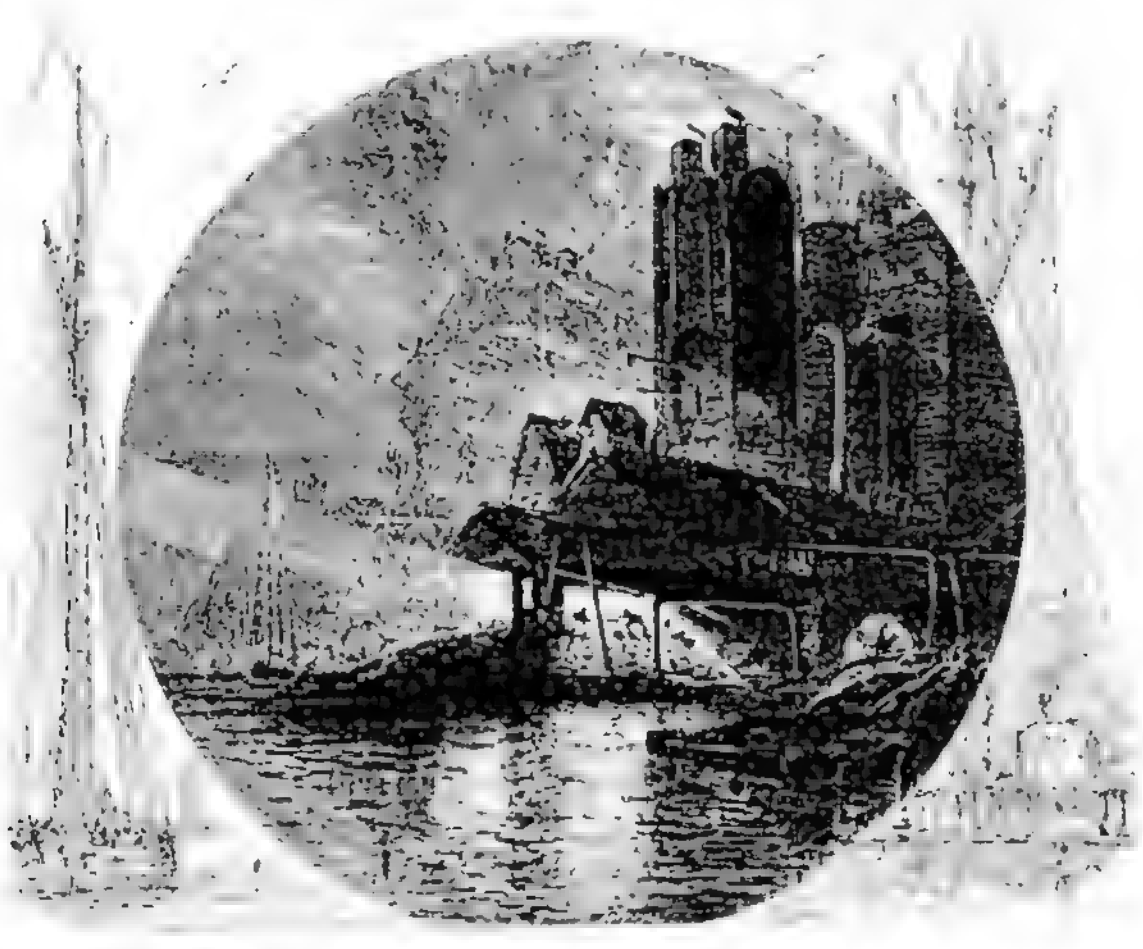


Figure 2 A. The East Bank iron foundry at night. Note the sloops to the left

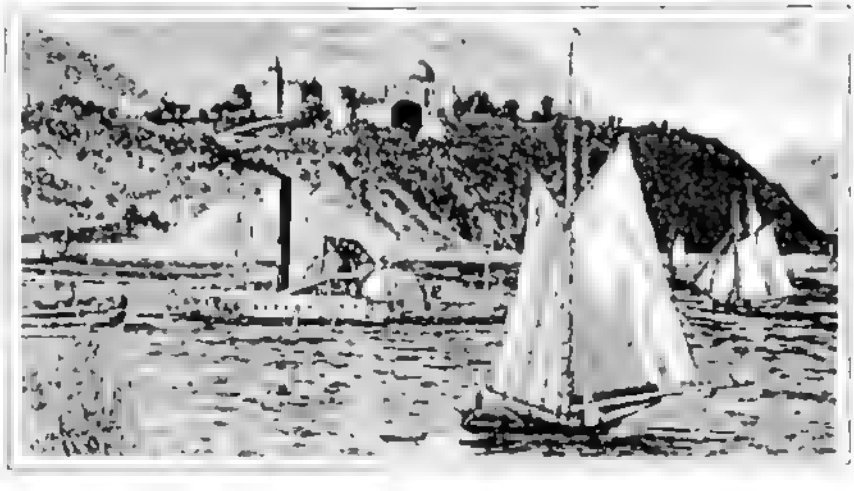
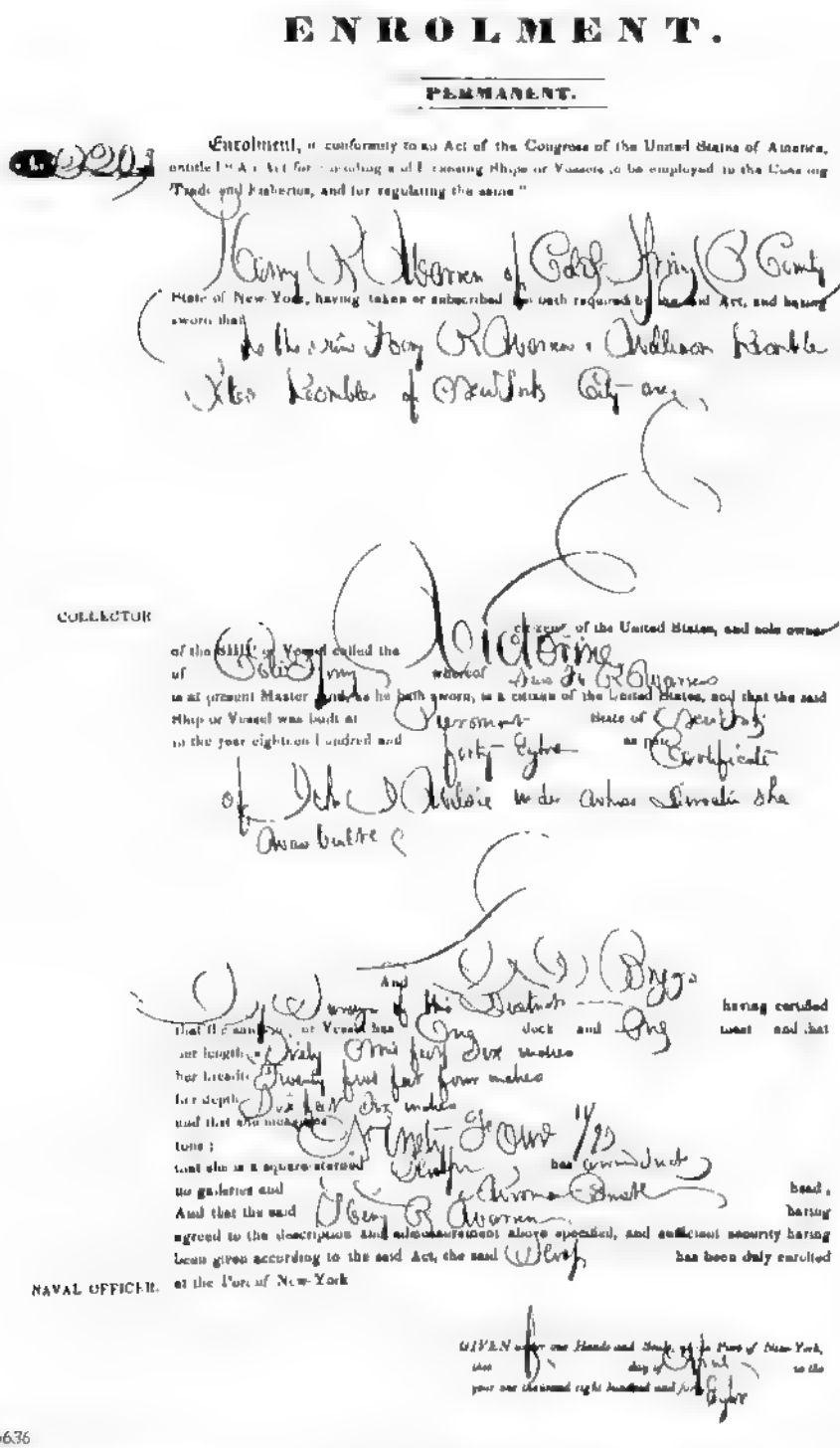


Figure 2 B. West Bank of the Hudson. A West Point typical H R. Sloop is in the foreground. (From Picturesque America). Author's Collection

Although this is a fitting tribute to designers and builders of such a craft, a legend is not without its problems. Often, fact is confused with fiction and the result is conflicting evidence and compound errors. Sorting through all of this can be a researchers nightmare and one needs the instincts of the bloodhound to stick with it.

The VICTORINE was a ca[illegible]e in research, full of the exciteme[illegible] of project can generate. Her story begins at Piermont, New York, a small riverfront community made famous by the New York and Erie Railroad in the early 1800's (Figure 1). She was built by Caleb and Joseph Weiste in 1848, and although the exact location of the building site is not known it is believed to be in the area called the Sloat between the Erie Railroad pier and the Sneden dock. Today this area is filled in with a salt marsh, but it still leads into the Sparkill Creek, named for the tall spars visible above the bulrushes which line the small estuary. At the head of the



ENROLMENT.

PERMANENT.

Enrolment, in conformity to an Act of the Congress of the United States of America, entitled "An Act for enrolling and licensing Ships or Vessels to be employed in the Coasting Trade and Fisheries, and for regulating the same"

State of New York, having taken or subscribed the oath required by said Act, and having sworn that

COLLECTOR

of the SHIP or Vessel called the Victorine of the United States, and sole owner

of the Port of Cold Spring whereof is at present Master and as he hath sworn, is a citizen of the United States, and that the said Ship or Vessel was built at Yorkmont in the State of New York in the year eighteen hundred and forty-Eight as per Certificate of

And

That the said Ship or Vessel has one deck and two masts and that her length is Sixty Nine feet Six inches her breadth Twenty feet and two inches and that she measures tons; that she is a square-sterned has no galleries and head, And that the said having agreed to the descriptions and admeasurements above specified, and sufficient security having been given according to the said Act, the said has been duly enrolled

NAVAL OFFICER. at the Port of New-York

GIVEN under our Hands and Seals, at the Port of New-York, this day of to the year one thousand eight hundred and forty-Eight

Figure 3. Archive #25636

creek the sloops off-loaded their cargoes onto wagons that carried the produce inland

The captains and sometimes the owners raced these sloops on Sunday afternoons. It was the speed of the VICTORINE that established her reputation as the fastest sloop on the Hudson

She had been commissioned for use by the West Point Foundry just south of the town Cold Spring, her home port She carried iron ore and limestone that was used in the reducing process from mines on the west bank Finished products from the foundry were shipped to the port of New York (Figure 2-B)

The Sparkil, originally dug out by the Dutch settlers, is today as it was then. It is deep enough to be navigable for shallow draft vessels Its northern bank is dotted with homes from the early 1800's with ample ground for building small vessels The creek is the first break in the Palisades along the Hudson, which has not only provided a safe haven, but also has easy access to the wood that lines the banks of the Hudson from Piermont to Haverstraw The area provided an abundance of oak walnut, hickory, white cedar and pine for ship-building

The Welsie brothers must have picked the best of the lot for the VICTORINE. Her enrollment papers indicate that she spent 46 years working the Hudson, (Figure 3). In her later years she was reduced to a barge and no one knows what finally became of her. Her papers were surrendered in March of 1894 at the port of Albany New York, but by then she had not been heard from for two years

Enrollment papers for a vessel such as

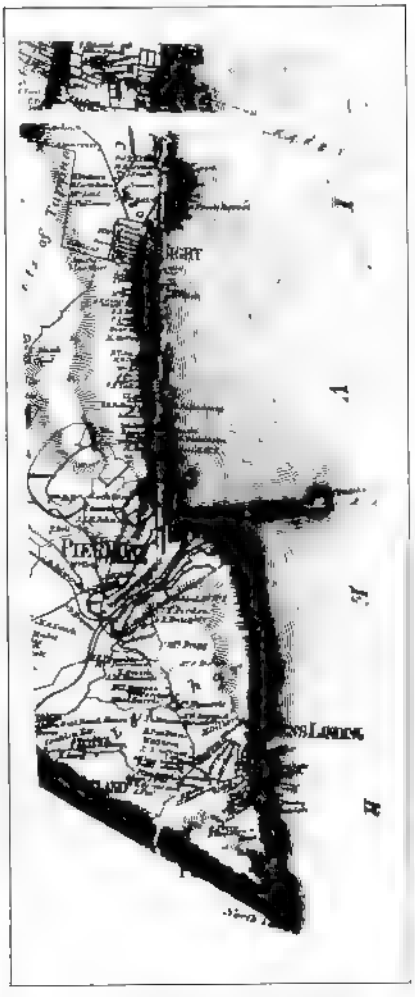


Figure 4. A map of Orange Town, 1859
Courtesy of New York Historical Society

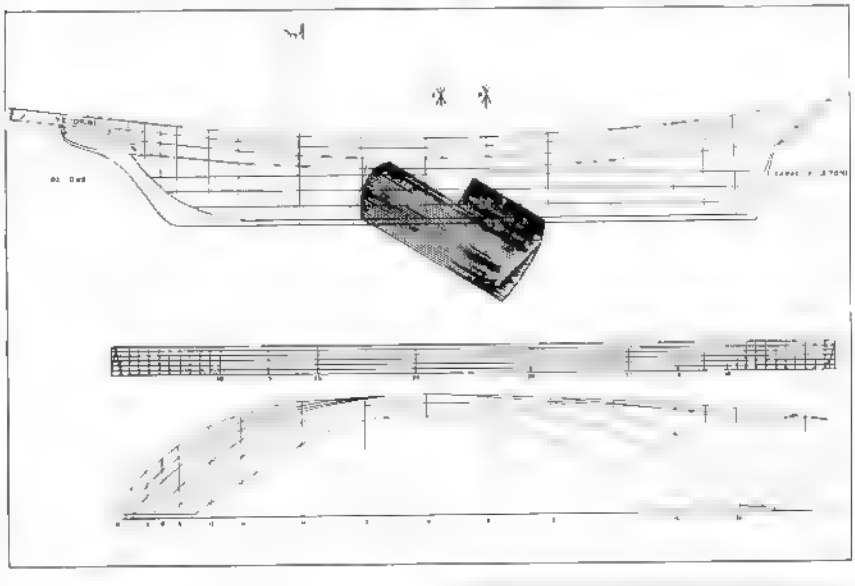


Figure 5

engaged in building a number of vessels for use on the Hudson. Several other names were mentioned, among them that of the Woolsey family later confused with the Welsie brothers. This was one of the reasons, in later accounts, the building of the VICTORINE was ascribed to them (Figure 4).

Myths and legends must begin somewhere and must be carried by print or word of mouth to survive. Surely there are other cases where famous vessels have been subject to romanticism but I know of none that have been as much the victim of it as the VICTORINE. For her, it began with the publication of her lines by J. W. Griffith in his *Treatise of Marine and Naval Architecture*, first published in 1852. Plate number 25 shows her lines (Figure 5). They were again published in Admiral Paris' *Souvenirs de Marine* (1882-1908) in very crude form by an unskilled copyist making her fine lines almost unrecognizable to all but those familiar with the Griffith work.

The dimensions of the VICTORINE are as follows:

Length — 67'0" Tons register 93
Beam – 25'0" Tons capacity 110
Depth – 6'0" Length over all (LOA) 74'0"

In Griffith' plate of the VICTORINE the tonnage is noted as 93. The old formula for figuring tonnage was: length of deck - 3/5 beam = A, × beam = B, × depth = C, ÷ 95 = tonnage*. Using this formula and the measurements given on the enrolment papers, you get the registered tons $94^{11}/_{95}$. (Converting the inches to decimals was overlooked in figuring 3/5ths the beam in Griffith's

*FORMULA SIMPLIFIED
A = length − 3/5 beam
B = A x beam
C = B x depth
Tonnage = C ÷ 95

the VICTORINE are a valuable research tool. Hers numbered 13 and recorded each change of ownership, hull modifications and tonnage, home ports and owners. Aside from the physical characteristics of a vessel, names and places associated with a vessel provide a starting point for gathering information from local and regional historical societies, newspapers and museums.

Family histories deposited with local libraries and historical societies often provide information not available elsewhere. Fortunately for me this was the case with the Nathaniel Gesner diary (1839-1855) in the Palisades Library. According to this diary the Welsie brothers and the Snedens of Snedens Landing

	Year	Type	Length	Beam	Depth	Tonnage
	1848 -	Sloop	69 ft 6 in	25 ft 4 in	6 ft 6 in	94 11/95
altered	1865*	"	67 ft**	25 ft	6 ft 3/10 in	68.07
	1868-77	"	77 ft	25 ft	6 ft 3/10 in	68.07
	1877-85	"	77 ft	25 ft	6 ft 3/10 in	68.07
March	1885	"	77 ft	25 ft (75 ft†)	6 ft 3/10 in	68.07
April	1885	"	77 ft		6 ft 3/10 in	68.07
	1886-88	Barge	77 ft		6 ft 3/10 in	68.07
papers surrendered	1894	"	77 ft		6 ft 3/10 in	68.07

* Measurements used in Davis model
** Possible clerical error
† Clerical error

Figure 6

calculations that arrived at 93 tons.)

The old method for figuring tonnage was changed in August of 1882 and the changes were reflected in the enrollment papers for the VICTORINE. Some attempt was made at altering the figures on the papers and the following table will illustrate some of the confusion created when the attempt to change the old records occurred (Figure 6)

In preparation for drafting a set of lines plans for the VICTORINE pictorial material was gathered along with written accounts that might shed light on the deck arrangement that was not indicated on the Griffith plan. I had remembered seeing a model of the VICTORINE by Charles Davis at Mystic Seaport and wondered if plans for that mode existed. A return to the seaport revealed some puzzling aspects of that model; most notably an eagle figurehead and a shortened forefoot. Clearly these were changes that Davis had made, but without his plans I could not confirm this.

About this time I received a visit from a New Jersey man by the name of N. A. Lyons who was kind enough to share his family records with me. His great-grandfather, David Lyons, had been captain of the VICTORINE in 1855. Among his papers was an article by Charles Davis that appeared in a 1932 issue of *Yachting Magazine*, that included the lines and sail plan Davis had drawn for the VICTORINE. It was evident from his lines that Davis had seen both the enrollment papers and the Griffith work. Both the archive number and the notation 93 tons appear in the article. The eagle and shortened forefoot also are shown indicating that these were the plans used for the Mystic model. What still remains a puzzel is why Davis used the first year of the tonnage correction (1865) for his measurements on his plans.

After checking his lines against those of the Griffith plate the changes Davis made in his measurements confirmed the alteration in hull form I thought might exist. Still, there was the question of the deck layout, and where Davis had obtained his information.

A log windlass and mast winch were two questions I put to Howard Chapelle who referred me to his *Search For Speed Under Sail* (page 175) for the mast winch which he felt was used as early as the later part of the eighteenth century. He also thought the log windlass was a possibility. The only evidence I had to substantiate the winch and a raised centerboard trunk was a painting attributed to Buttersworth (Figure 7) circa 1855. Chapelle did not comment on the use of the sliding cover on the companionway. The Buttersworth painting does not show this type, but rather the hinged variety illustrated in *Search For Speed*, plate 48.

Four years earlier than the Davis *Yachting magazine* article, one appeared in the *Rhode Island Mariner*, a ship model club periodical, that was written by Alfred S. Brownell. The subject was the North River Sloop. The article centered around a model built by Irving R. Wiles, his research sketches and plans for the model.

Wiles explains that although he used the Griffith lines for the hull, the deck fittings were taken from sketches he had made aboard three old sloops that had been converted to schooners that he had found in Staten Island. The oldest, the COMET, was the subject for Wiles detail sketches of deck fittings, including the jib club boom. This feature is also shown on the Buttersworth painting. Curiously Wiles mentions a comment by Captain H. Percy Ashley that these club booms were not used on sloops of the VICTORINE period (Figure 8)

A year later, Captain Ashley was to use tracings of these sketches in an article published in E. A. McCann's *Shipbuilder* magazine under the title "North River Sloop, the authentic lines of a 58 footer designed by Lauchlan McKay in 1839" (Figure 9). These lines, with the Ashley embellishments, actually were published without the stem, rudder and deck details in Lauchlan McKay's *The Practical Shipbuilder* under the heading of "Sloop" (Plate Five). Included in Captain Ashley's article was a photograph of the model built by Wiles entitled VICTORINE.

It would have been helpful if the plate in the McKay work displayed a hint of authenticity, however it, as with the others in that volume, it was traced by McKay's wife whose strong point was not drawing. Almost no information is given in the description of the plates for this sloop with the exception of a curious heaver for the windlass consisting of an iron band fixed to a pole.

The original Brownell article with Wiles sketches indicate a log windlass with the typical heaver (Figure 10), presumably found on the COMET. There are two deck layouts shown in the Brownell article and the second (Figure 11) comes closest to that used by Davis on his plans for the VICTORINE. The Davis plans were to go on to form the reference material for the modern replica of the Hudson River sloop CLEARWATER, and to be copied by R. L. Bittner in 1937 then later used by Marine Models as a basis for their kit version of the VICTORINE.

To date, the only source material gathered first hand and recorded appears to be the sketches made by Wiles on those early sloops at Staten Island. There are considerable numbers of Hudson River paintings, Bartlett prints, and newspaper line drawings of sloops of this period but very few photographs.

One such treasure was uncovered during this research project in a private collection of glass plate negatives now in the collection of the Historical Society of Rockland County. The print from this negative shows a group of sloops in the Sparkill Creek about 1860. The date is fixed by the dwellings to the left of the photograph (Figure 12).

This photograph would prove helpful later on when planning the rigging diagram for the VICTORINE. Opinions, regardless of date, seem split on the use of one large double block or two small single blocks serving the peak halliards. The Sparkill photograph shows the large double block on the sloop in the foreground. Two eras are represented here; note the sloop with the clipper bow in the background. The other questions regarding the companion way or cabin trunk were not answered completely. The older sloop shows the

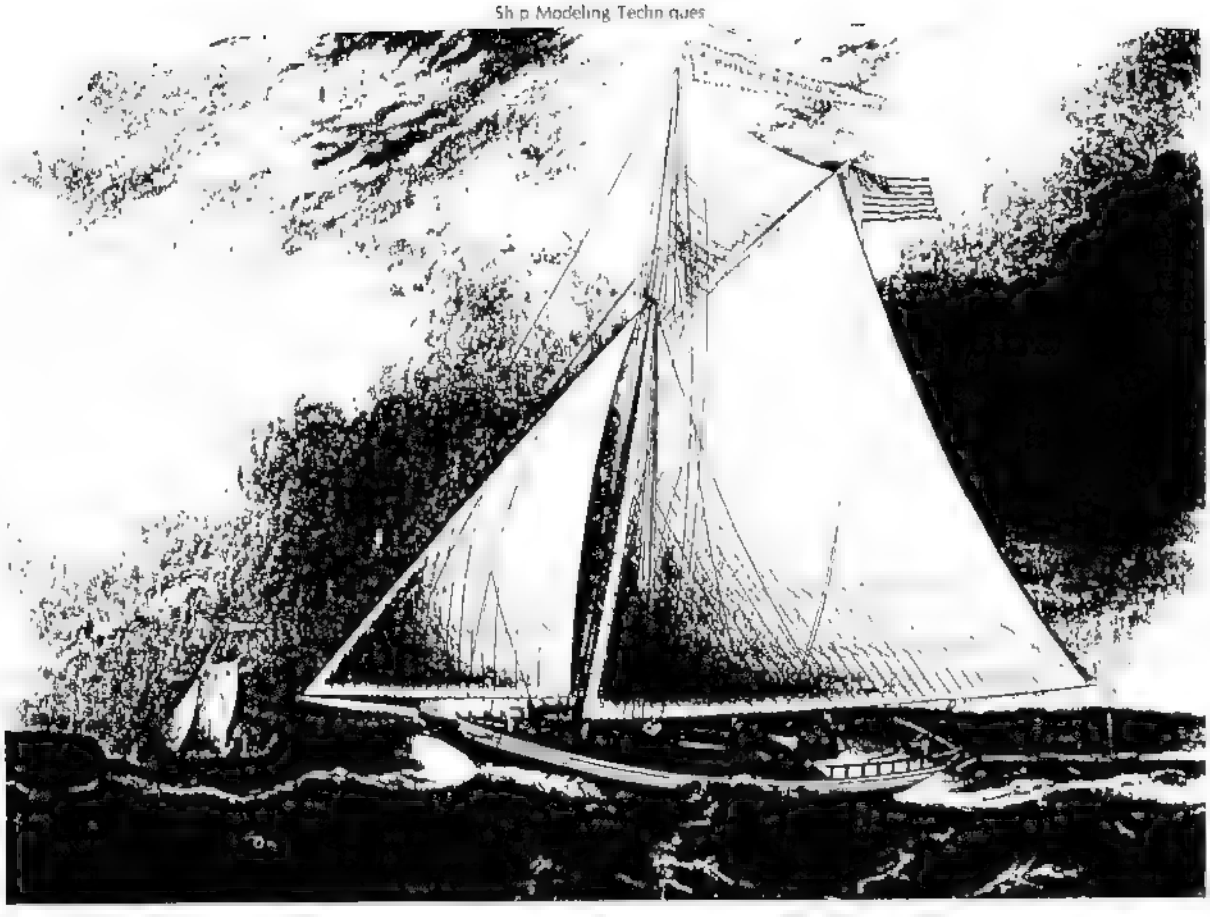


Figure 7 A Hudson River Sloop by Philip R Pauld ng Circa 1855 (atributed to James Butterworth)

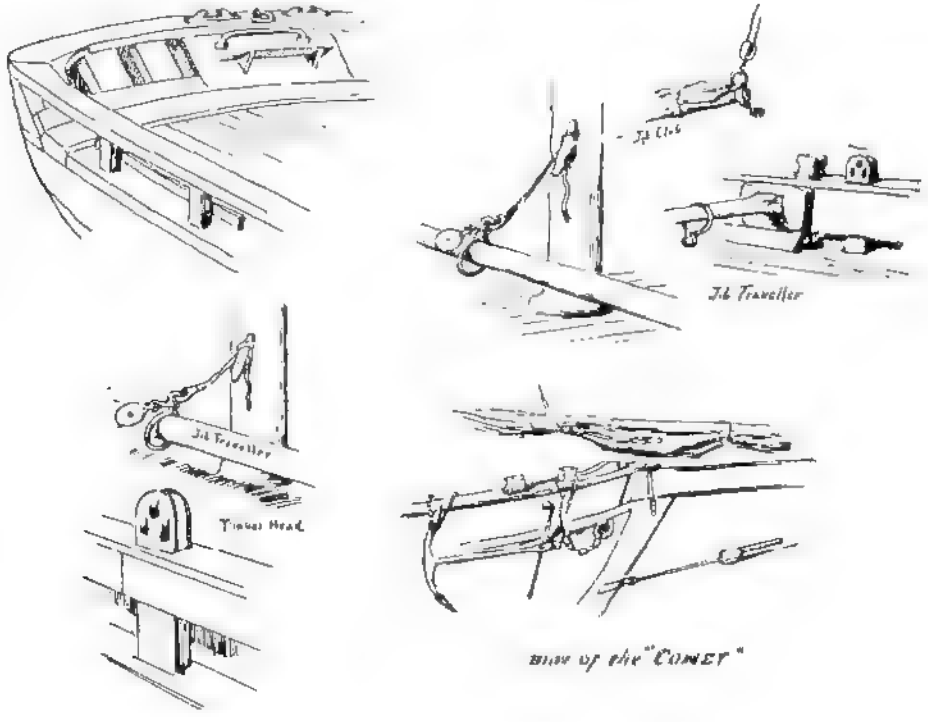


Figure 8

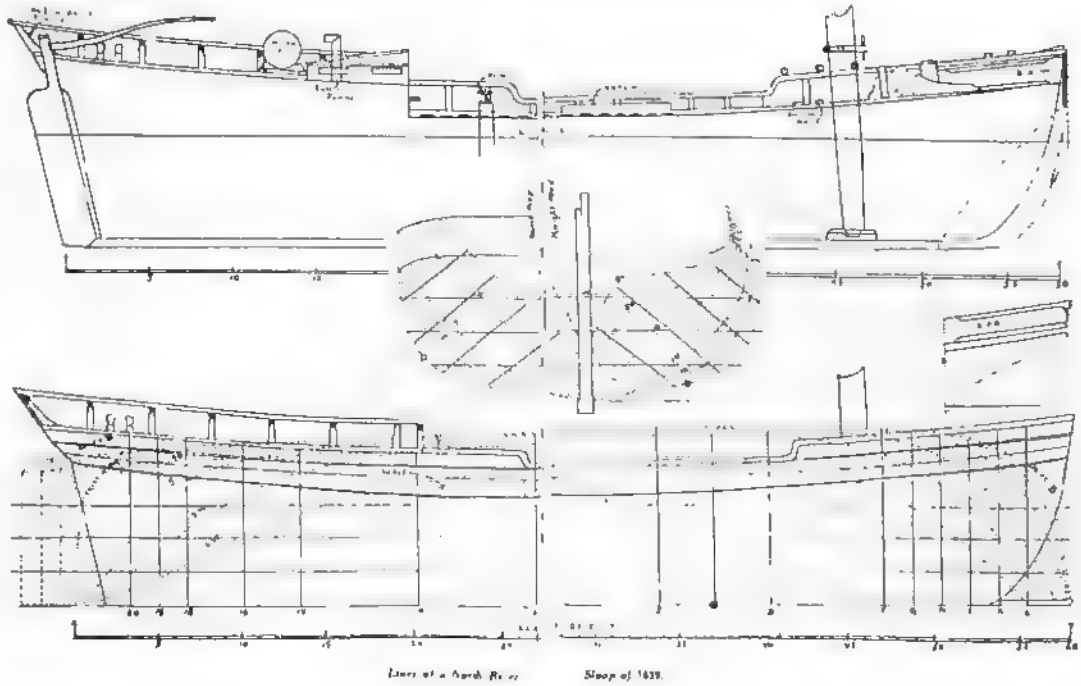


Figure 9

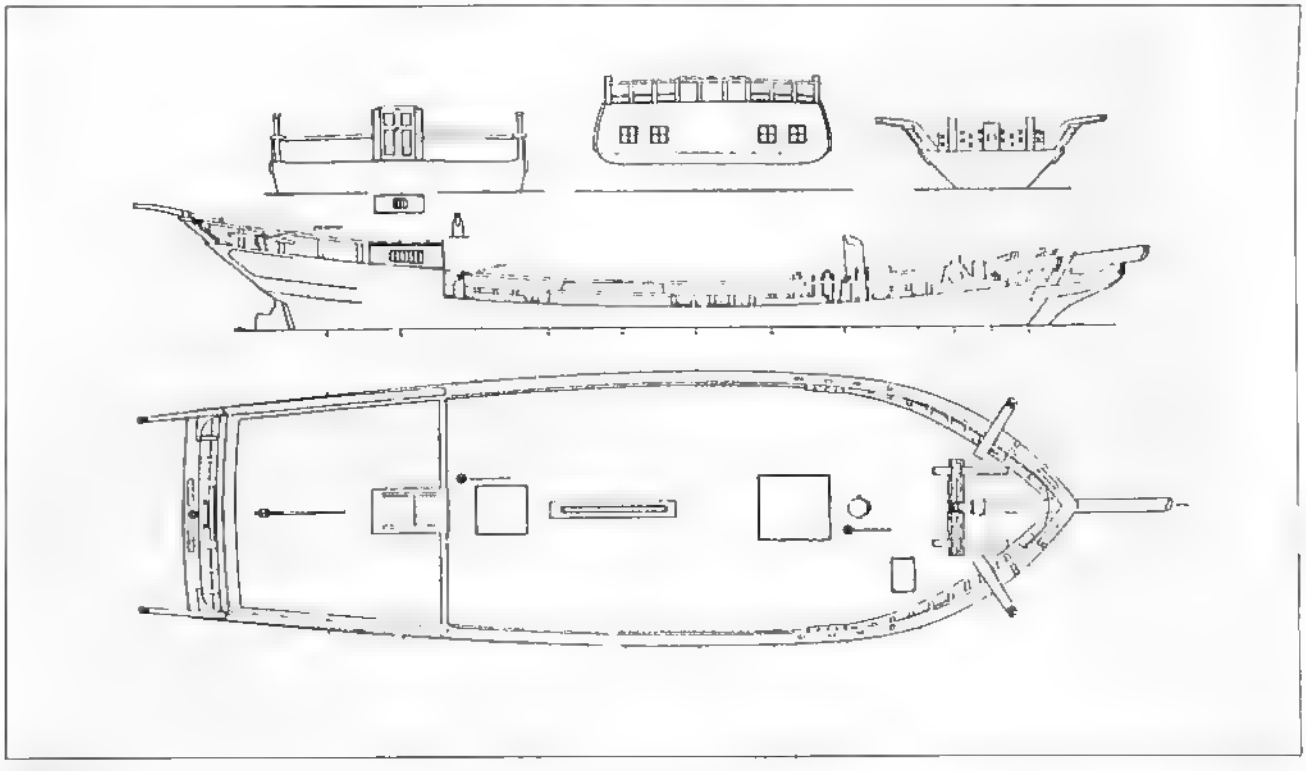


Figure 10

cabin trunk of the passenger and light cargo sloop while the newer sloop shows the sliding cover over the ladderway.

Both sloops show short pole masts The older one has the marks of 13 hoops on the topmast, iron mast cap and wooden trestletrees with no spreaders. The newer sloop in the background does show spreaders and topmast stays. Both have a single pair of shrouds without rathnes. Both Howard Chapelle and John Leavitt state that the masthoops served as ladders Ridges graven into the lower mast on the older sloop give an indication of the number carried there.

Of the score of books which mention the VICTORINE, none agree where she was built, the names of her builders, her dimensions, history or employment. The major source of misinformation is the book *Sloops of the Hudson* by Verplanck and Collyer, published in 1908

Unfortunately it continues to be referenced. Most of the information was supplied by aged former captains whose recollections were clouded by time In the case of the VICTORINE Captain Collyer states, "she was built by John I. Woolsey of Haverstraw." Verplank states, "she kept the river until 1890," then goes on to say she ended her days in 1901 as an oil lighter for a company in New Jersey. Such is the stuff that research nightmares are made of!

Aside from sorting through the weight of material to see who said what when in word or picture, there is still the job of validation. For me it was clearly a return to the lines published by Griffith and the

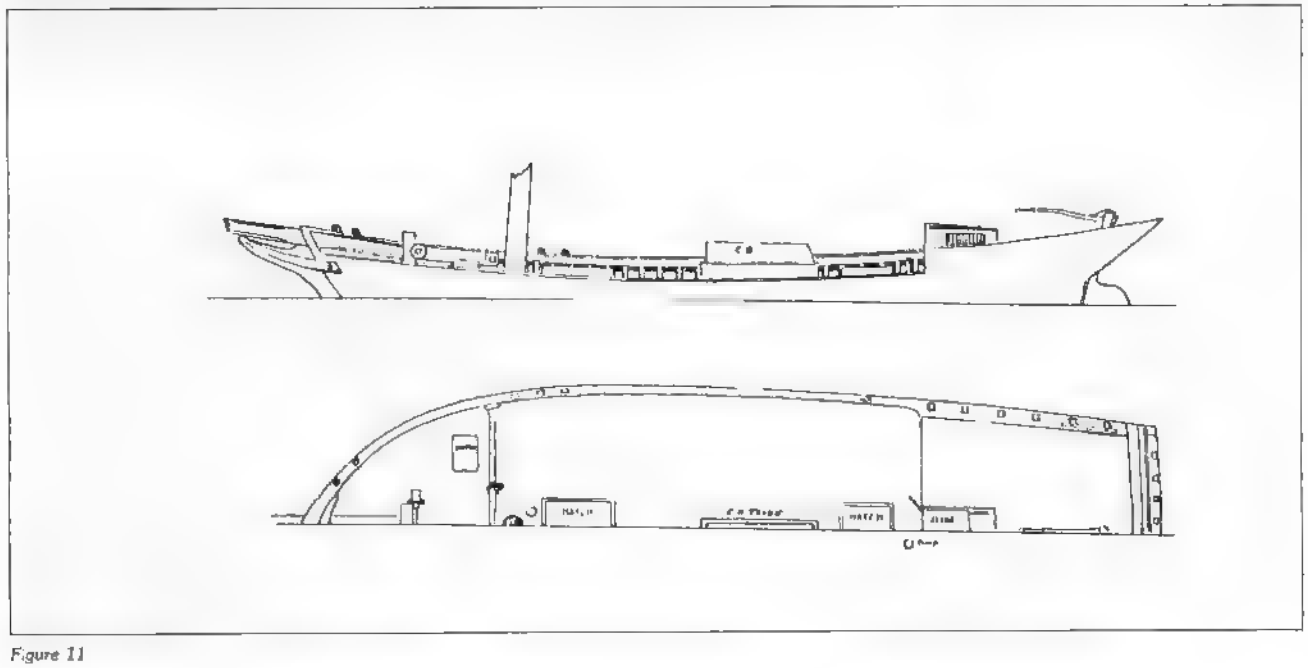


Figure 11

Figure 12 A glass plate photo of sloops in the Sparkill Creek, circa 1860

enrollment papers. My next task was to draw a set of lines plans which would include the framing of the VICTORINE a sail plan and building a model of the vessel that would be as historically close to how she appeared in 1848

The VICTORINE project began in the latter half of the 1970's as a request from the Rockland County Historical Society for a class in ship model building they wished to offer in their spring program Although the idea was an appealing one, I doubted that such a course could be taught in a six week period, without part of the work involved already done. That would mean using a kit of some sort containing a precarved hull

The Historical Society wanted the subject to be a Hudson River sloop and at the time there was a kit of the VICTORINE with plans drawn by R. L. Bittner They had been prepared in 1937

Preparations for this class made corrections in the plans impossible but I felt the group could be made aware of some of the problems as we went along without compromising what it was they were trying to accomplish Certainly I would point out the end for research into a vessel and also bring home the fact that there is a point when you must draw the line and get on with building the model

Work on the lines of the VICTORINE had progressed enough to give these first students an idea of what went on below deck and the relationship the deck framing had to deck furniture and planking (Plate One). Still ahead of me was a sail and spar plan, but I also knew if this class proved successful I would have to redraw the plans for a solid hull model

Over the years I've had queries from other modelers who have thought they would like to teach a class in ship model building. The advice I always give is not to underestimate the beginner's intelligence and ability to comprehend

A students enthusiasm has always been a wonderment to me To witness the joy of creation, regardless of skill level, is quite a privilege. To have been a part of it for eight years enriched my life and has given me a lasting respect for these beginners who have been so willing to take on the challenges of so exacting a hobby Plate Two shows the solid hull version of VICTORINE as she was used in subsequent classes.

Among the vast amount of pictorial material available are the woodcuts

Figure 13. Looking west across the Hudson from Irvington. This Bartlett engraving depicts the square topsail sloop and steam driven hay boats that also carried passengers on the Hudson, circa 1837.

and engravings done in the ear y 1800s. Many of these appeared in popu.ar newspapers and periodca's that have survived unt today. From these you get a panoramic view of the Hudson River sloop and her rig. Some early Bartlett engravings done in 1837 show the square topsail (Figure 13), fore runner of the gaff sa l, while others of about the same time show only the gaff r g (Figure 14). This m.gh' ind cate the transitiona per od between the two rigs.

Another source for a variety of periods is in the *Valentine's Manual*, published n the '20s and edited by Henry Collins Brown. One volume totally devoted to the history of the Hudson was il ustrated with paintings from public and private collections. One of these reproduced in color provided me with the color scheme for the VICTORINE (F gure 15, shown in black & white).

Although there were changes in the shape of the bow over the years the general design of the transom remained more or less the same in these sloops

F.gure 14. Another Bartlett engraving. Th s time the upper Hudson at Haverstraw Bay. Note the brig in the background, and again the hay boat. This print is dated 1838.

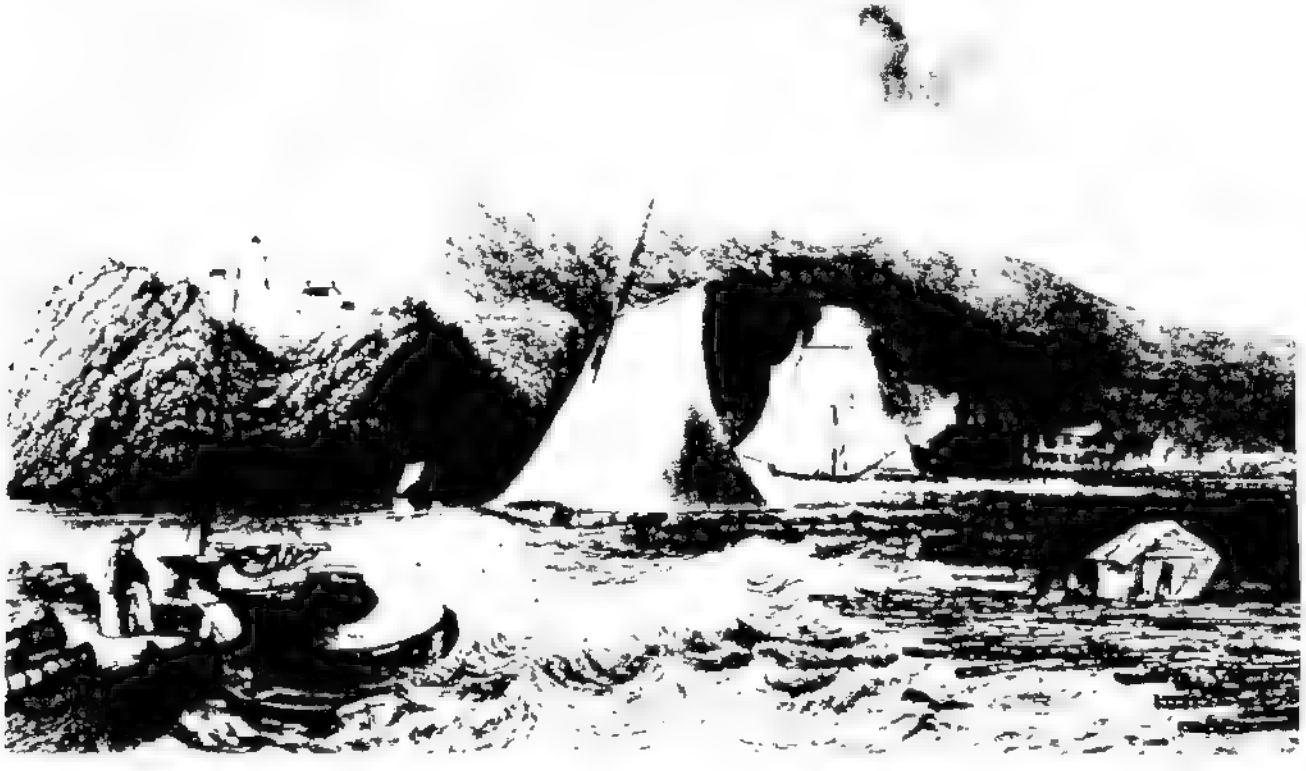


Plate One

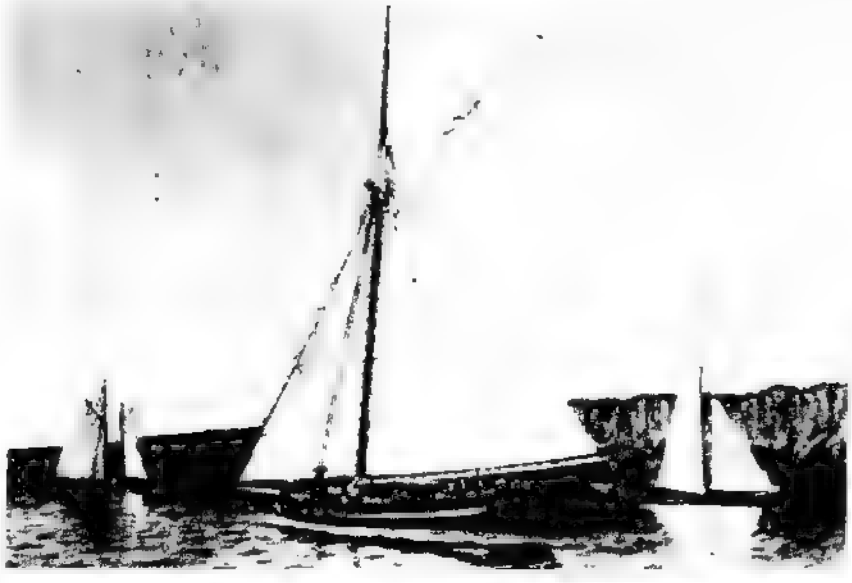


Figure 15 A lithograph from Currier's original done from a color print of a pilot schooner. This is perhaps the best representation of a Hudson River sloop. The view is at the outer Hudson near Fort Lee, New Jersey.

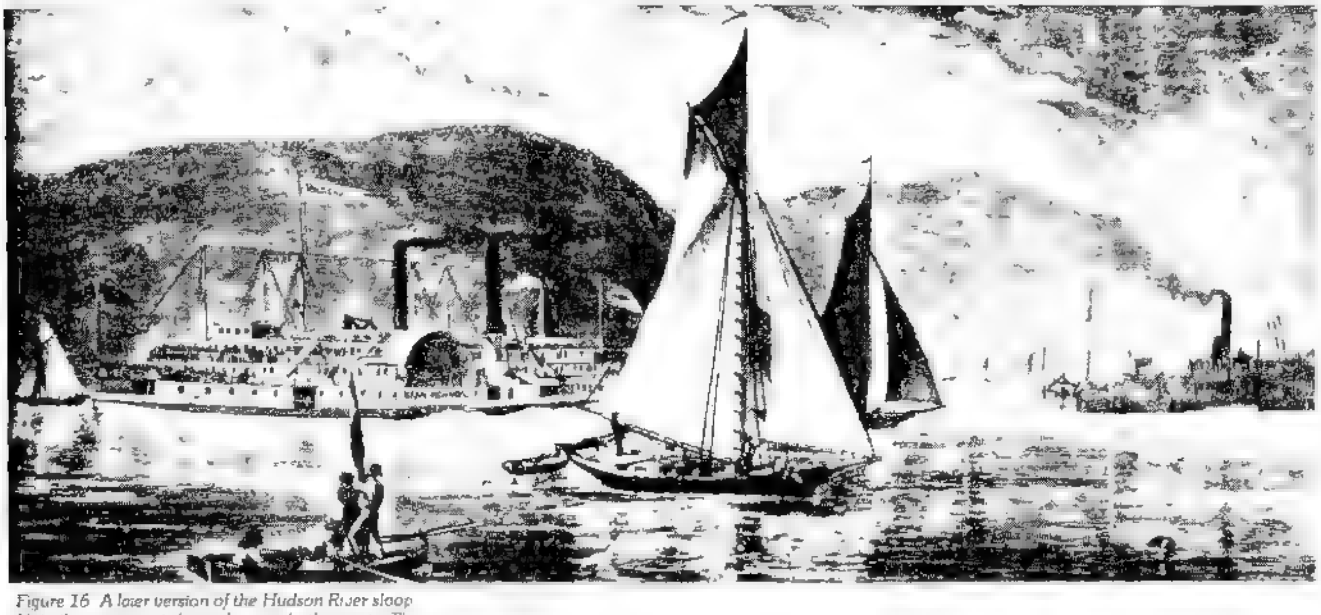


Figure 16 A later version of the Hudson River sloop. Note the prominent clipper bow on both vessels. The view is off Poughkeepsie looking west towards the highlands, circa 1860.

(Figure 18). The arched taffrail, curved counter and window lights became more or less standard well into the 1860s.

The lines of the VICTORINE as shown in Griffith's *Naval Architecture* only indicate a slight fore and aft curve athwartship and arched counter and taffrail, so any stern elevation would have to be a reconstruction from pictorial evidence. It was possible to draw a complete set of lines from those shown in the Griffith work by just using the profile and half breadth to draw in the body plan.

Most useful was the size and location of the centerboard and the foreward boundary of the centerboard trunk below deck. If a tracing is made of this member and then placed over the Griffith's lines you can see how far the upper edge of the centerboard will come above deck by pivoting the board tracing on the pivot bolt shown. The notched section of the board clearly indicates a centerboard trunk housing above deck.

Anyone who has sailed the Hudson with a centerboard skiff, or daggerboard skiff as they're called now, will tell you how important it is to get it all the way up at low tide. Otherwise, you have a long and muddy way to walk in to shore at some points on the Hudson.

The flatter the bottom, the easier it is to float out with the next tide. Griffith has the following to say about the VICTORINE:

"Vessels of this class or description form a very considerable part of the domestic commerce of the United States and bear a strong resemblence in their principle dimensions and rig to the English cutter, although the shape differs in some particulars, yet there is a kind of sameness in the appearance of both, with this exception: the cutter has no stay to support the jib: the mast and bowsprit are shorter in the cutter than in the sloop. They are found to be the most serviceable kind of sailing vessel that has ever navigated the Hudson and East Rivers, many of which are engaged in the transportation of brick.

They have a brake (break) in the deck line about half its length, or somewhat aft and have a bulkhead across the entire main deck, the quarter deck is raised for the purpose of furnishing cabin room. Their great breadth enables them to carry enormous deck loads: the round of their

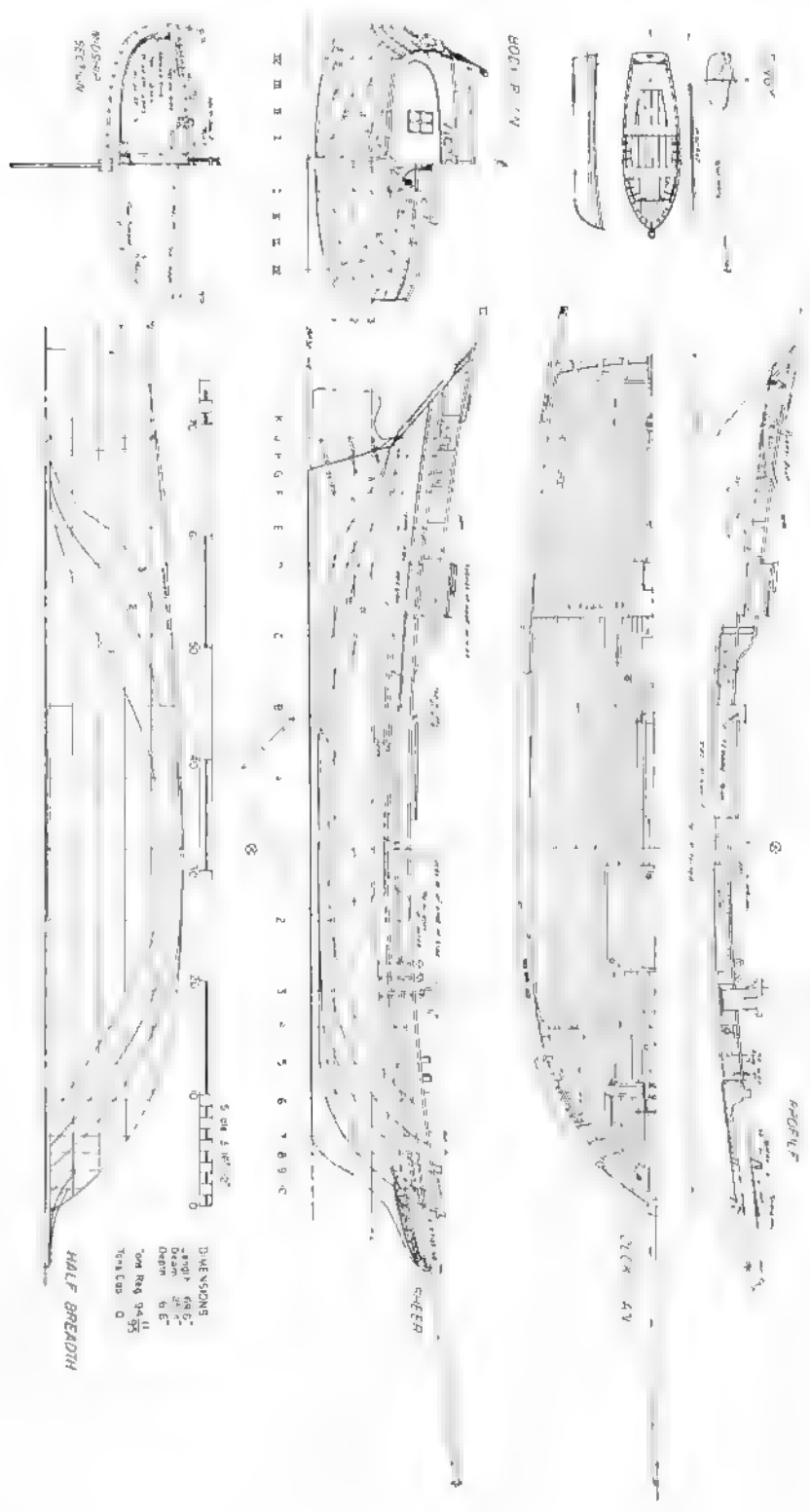


Plate Two

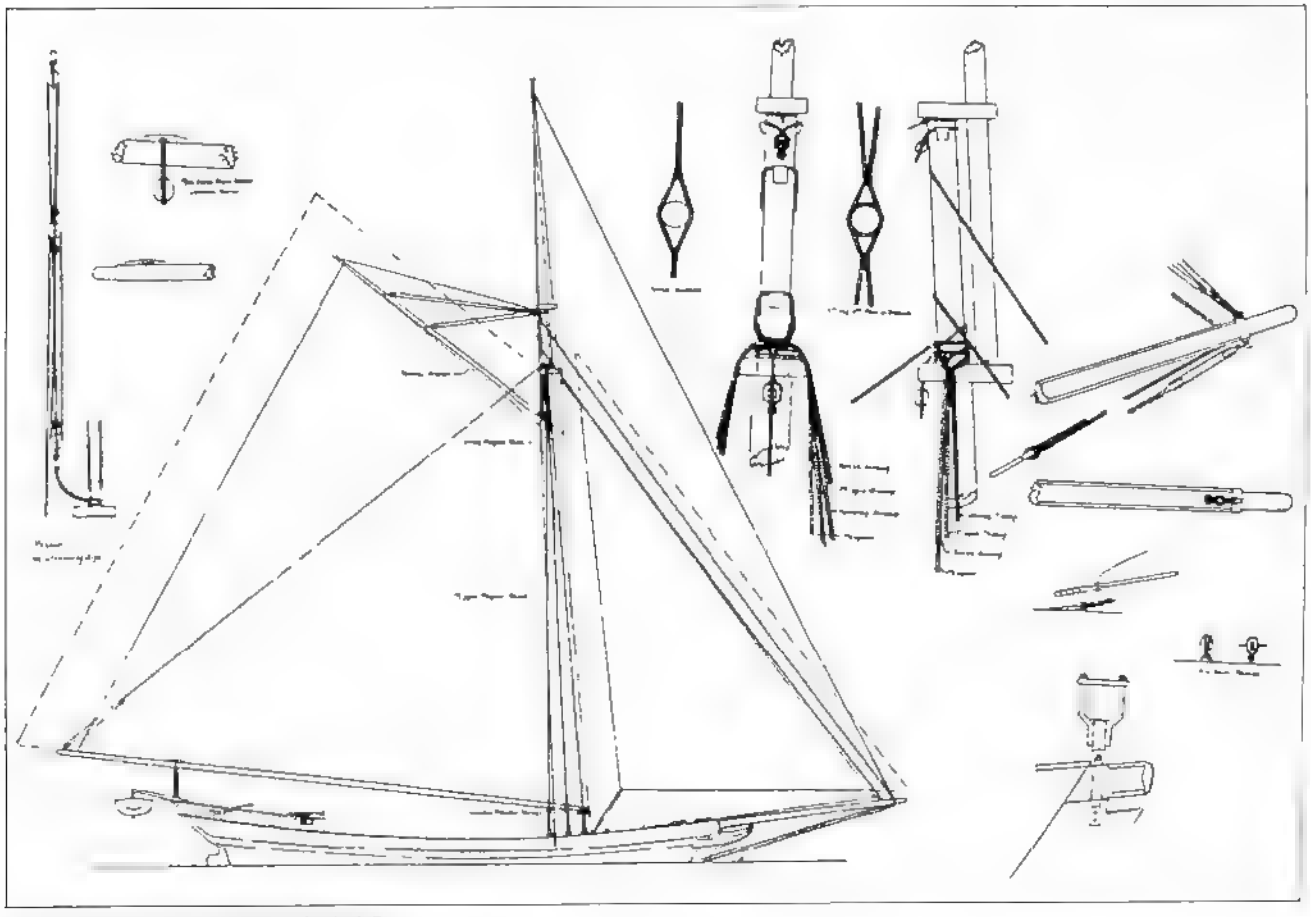


Figure 17. The sail plan and rig details of a North River sloop

deck transversely (athwartship) exceeds that of any other kind of vessel — often exceeding 12 inches in 26 feet."

From this description, you get a clearer picture of what the vessel looks like and are given the valuable information on the deck camber. Griffith gives a detailed description of the housing and the importance of making it leak proof. Of the centerboard itself he tells us that, *"It is usually hung at the fore end by a single bolt placed 2/3rds its breadth which would allow the board to hang 2/3rds below the bottom of the keel. Thus hung, when it strikes the bottom of the river it will rise without damage to the vessel."*

The size, shape, and location of the centerboard longitudinally dictates where the break in the quarterdeck will occur and where the bulkhead for the main cabin below deck will be placed.

In order to know the number of frames used in the VICTORINE and the space taken up by the size of the timbers used in the framing of the vessel, it was necessary to turn to another book by Griffith, *The Ship-Builder's Manual and Nautical Referee*, published in 1851. In it he details the scantling requirements for merchant vessels of various types. His comments on the relative strength of timbers used in framing and planking hulls is particularly useful to anyone considering the task of drawing a framing diagram for vessels built during that period.

Some of the tables begin at 100 tons and list all the sizes for each of the timbers that make up the framing for a hull. The number of frames Griffith suggested for a sloop was 41, including all the square frames and cants. To me this seemed a little heavy, but I took his word for it and used 41 frames in drawing up the first lines plans for VICTORINE.

The spars and sails were another matter. Griffith wrote that the rule for masting ships in the United States is the most variable in the world; the most prominent builders each profess to have a mode peculiar to himself. However Griffith also says that "for sloops the spars are less variable."

The proportions found in Griffith's *Naval Architecture* are as follows.

Mainsail —

Hoist	2 1/2 x beam
Foot	3 beams and 1 depth
Leech	3 beams and 3 depths
Head	1 beam and 3 depths

Jib —

Luff	foot of Mainsail
Leech	hoist of Mainsail
Foot	head of Mainsail

Brownell, in his article on the North River sloop in the *Rhode Island Mariner*, illustrates both his sail plan and that of Griffith (Figure 17). He felt that the area was excessive for a vessel her size.

"Griffith's formula works out well when applied to a sloop of normal beam but, when used on the wider Hudson River boats, the area is very large."

I have to agree with Brownell. Griffith's sail plan does look oversized for his vessel. However, it doesn't appear to be the VICTORINE. Plate Three shows the sail plan I drew for her.

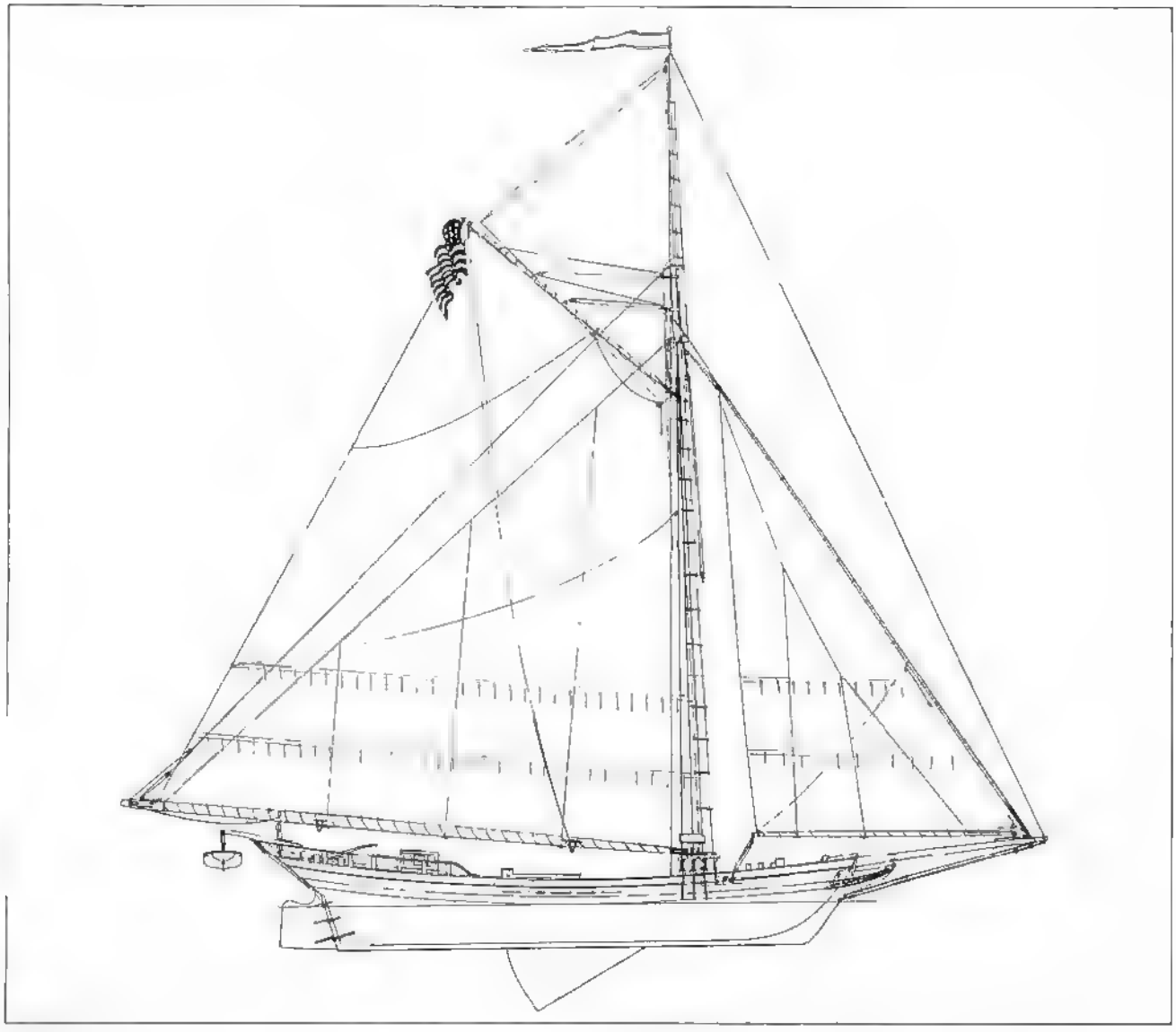


Plate Three

17

Assembling A Solid Block Hull

I will outline a simple method of assembling a solid block of wood made up of slabs, or lifts. Briefly, these lifts are cut to the length of the hull and stacked to the height of the hull, glued together, and cut to the outline shape of the hull. What follows is how this is done.

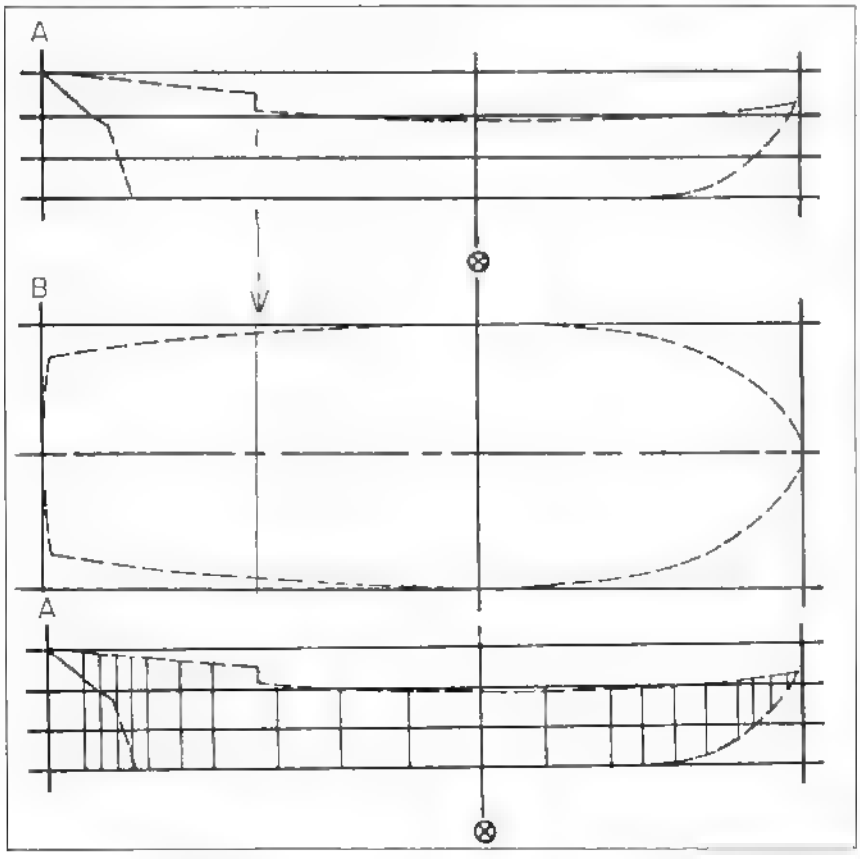
To begin, two separate tracings are drawn from the lines plans, one that outlines the sheer plan and the other which outlines the half breadth plan. The tracings help define the cutting line and give you a better idea of how much wood you will need to make a block. Although the classic lift model requires a slab of wood for each waterline, this approach allows you to combine the heights of two or more, eliminating the need for milling off sizes for each lift. Because it is sometimes difficult to see what area should be covered with the tracing, the lines plans and the areas to be covered are shown in Figure 18-1.

Since the stem, keel and sternpost are added later, the first tracing (18-A) is just the profile of the hull. You'll note that the bottom line of the tracing is located at the top of the keel, and that there are three divisions within the grid representing three lifts. Each of these for the VICTORINE are 3/4" thick. An important reference point is the mid-ship line drawn through the profile and half breadth tracing shown with the symbol ⊗.

In Figure 18-B the tracing area covers both sides of the hull with a center line down the middle. This reference line together with the mid-ship line, will help to position this tracing when it is applied to the top of the assembled hull block, as will the lowest horizontal and mid-ship line on the profile tracing applied to the side of the block.

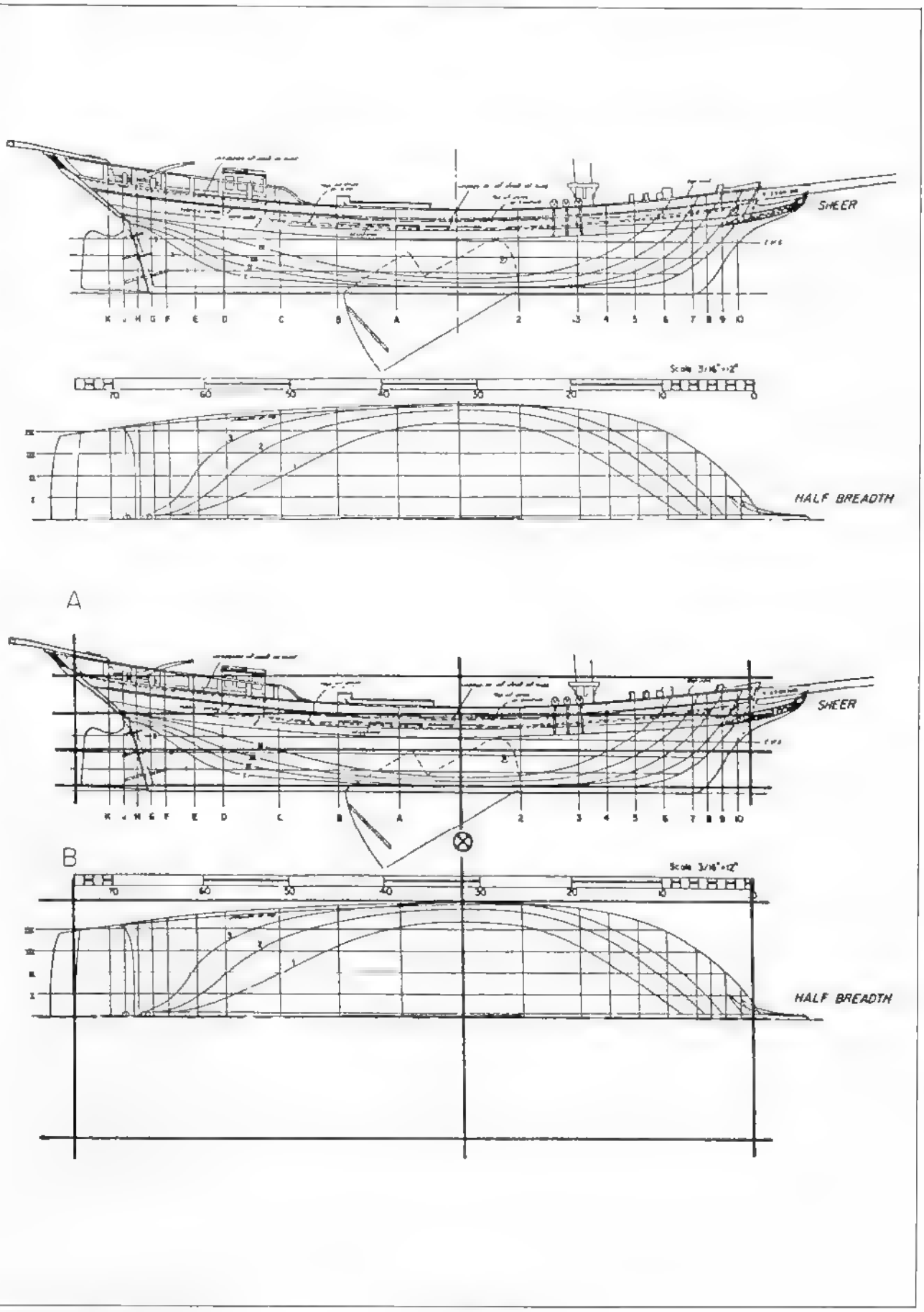
To establish the cutting lines for the outline shape of the hull on the tracings (Figure 19-A and 19-B), begin by drawing in the top of the deck at the centerline. Then, draw the curve of the bow and shape of the stern to the inside of the stem and sternpost (19-A). At the break of the quarter deck drop a line down to the half breadth tracing (19-B). On the half breadth tracing, draw in the extreme breadth line on both sides of the center line (19-B). This will complete the half breadth tracing but the profile tracing (19-A) will need to have the station lines drawn in as in Figure 19-A.

Figures 19A & 19B

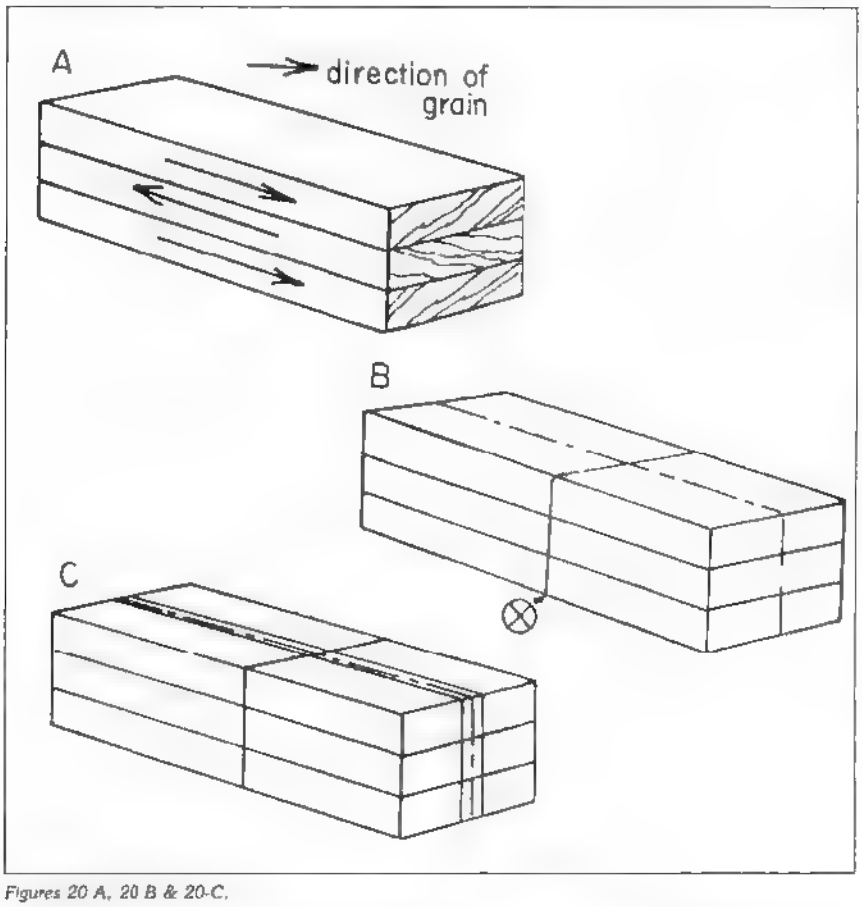


ASSEMBLING THE HULL BLOCK

The choice of wood used to construct the block for the hull can be up to the builder and what you feel most comfor-



Figures 18-1, 18 A & 18-B



Figures 20 A, 20 B & 20-C.

table using. However, it should be well seasoned and knot free for best results. The 3/4" slabs were selected because it is a thickness easily obtained at local lumber yards.

There may be some people who would prefer to use woods such as bass or cherry and the best place I know of to obtain these at a reasonable price is the Lumberyard, which caters to the special needs of model builders.

You'll need a board about four feet long which will allow for saw cuts and waste at the ends of each slab. The profile tracing will give you the length of the slabs and the half breadth will give you the width. Allow at least 1/4" waste material on the length and width of each slab.

The best approach for gluing the slabs together is to glue two of them together at one time. When these slabs are set, add the third. If all three are glued together at once, there will be a tendency for them to shift out of position when clamped. The most efficient glue to use is Titebond alaphetic resin glue. It sets up quickly yet allows sufficient time for positioning prior to clamping.

For actual clamping "C" clamps are recommended, although care must still be taken to prevent the work from sliding out of position when the clamps are tightened down. To help avoid this, allow the glue to become tacky before joining two slabs together. If the wood is soft, such as pine, protective pads should be slipped under the feet of the clamp to avoid denting the wood.

When dry, the hull block should be sanded smooth on all sides and squared up on the disc sander. You will need a smooth, square surface on which to rubber cement the tracings of the hull (Figure 20-A).

The completed hull block is now ready for marking. Use a well sharpened pencil and begin with drawing a centerline on the top and bottom, and ends of the block. Use one of your tracings to locate the position of the mid ship line on the block, then mark this line on the block (20-B).

After the outline of the hull has been cut out it will be shaped by the use of templates. For this phase you will need another reference line. It will be the width of the keel drawn in on both sides of the centerline at the top and bottom sides of the block (20-C).

MOUNTING THE TRACINGS

Mount the tracings to the hull block with rubber cement. Both the tracings and the block are given a light coat of rubber cement and allowed to dry before applying the tracings to the hull block. A couple of slip sheets placed between the block and the tracing (overlapping about one inch) will make the operation more manageable (Figure 21).

Use the mid-ship line and the lowest horizontal line on the profile tracing to align the profile tracing on the side of the block. Once the tracing is satisfactorily positioned hold down one side and pull out the slip sheet. Smooth that side down as the tracing makes contact with the block, then pull out the second slip sheet and make sure that half is smoothed out. Apply the extreme half breadth tracing the same way only this time use the centerline and the mid ship line to assure the alignment.

CUTTING THE HULL

You make four basic cuts in the hull block: two at the ends, the sheer or profile of the deck and, finally, the extreme breadth or shape of the hull from the top of the block. An additional cut will be necessary at the break of the quarterdeck to release the raised portion from the main deck level (Figure 22-1).

After making the first cuts at the bow and stern (Figure 22-2), turn the hull block over on a flat surface and draw in the centerline at the bow and stern. Use the markings on the bottom of the block, the uncut portion at the bow and the top of the block as guides for this line and the width of the keel line.

Next, make the second cut, beginning at the bow towards the break in the quarterdeck and the release cut there. Save the cut-off pieces for later. Then make the third cut at the quarterdeck. The completed profiling cuts are shown in Figure 22-3. You'll note that all of your cuts thus far have been made with a flat side of the hull block at right angles to the cut. A band saw or scroll saw is the best tool for this job.

The fourth and final cut must be made after the cut-off sections have been rubber cemented back onto the top of the block. However, before this is done you will have to draw in the centerline on both the quarterdeck and main deck and then draw in the station lines on both decks. These are particularly important and for that reason I strongly urge you to scribe them with a sharp awl. If one is not available, then use a sharp darning needle.

Once this is done, you can proceed to coat both deck surfaces and the cut-off pieces with rubber cement. Allow these to dry, then join them to the deck surface and make your fourth cut (Figure 22-4). Again save the deck pieces for later, and only dispose of the outboard waste.

The final step prior to shaping the hull is to pencil in the station lines on the sides of the hull block. Use the stations on the deck surface as a guide for placement. The hull block is placed on a smooth flat surface. Use a small plastic triangle (five or six inch will do) to line up the stations on the deck for penciling in. This must be done on both sides of the hull.

The deck cut-off pieces can then be tacked back on the top side of the hull block, the block inverted a building board. Until the hull has been shaped, the

the building strip will not be required

MAKING TEMPLATES — SHAPING THE ROUGH HULL FORM

In shaping the rough hull, you should work with whatever tools you are most comfortable with (hand or powered). The templates you'll make will be used in conjunction with these. Soft graphite rubbed on the edge of the template will give you the exact amount and location of wood that needs to be removed within the area of a given station. As the actual shape of the hull emerges, these graphite marks will cover a larger area and more of the station line will be removed. As you work, these lines will have to be replaced.

There is considerable wood to remove in the area of the stern, but cautious shaping is advised; in spite of greater number of stations here and at the bow, the curves in these areas are deceptive and it's easy to remove too much. If this happens, flatten the area with a file, and glue on another scrap of wood

As you get closer to the overall hull shape, your best tool will be sandpaper (in finer and finer gradations). For more complex curves try making sanding blocks from pieces of cork. Fishing floats are good for this. They can be shaped on a sanding disc to suit your needs, and they last a long time.

A word of caution: no amount of sealer or paint will eliminate sandpaper scratches; which is why successively finer grades are recommended. There are micro finishing films available from most hobby supply houses that produce a fine eggshell finish, and can be used over again by running them under water to remove the accumulated sawdust

In general, templates are thin pieces of stiff cardboard cut to the shape of the curved stations on the body plan. They help shape the hull, and are used in conjunction with the building board both during the rough shaping — while the hull is inverted - and later to locate details on the side of the hull after it is mounted on the building strip. When the template is inverted, it will be flush with the upper face of the building board (Figure 23-A and 23-B,

The only exception is the template for the shape of the stern. The reason for this is that this template is both the full height of the hull block and the highest point on the basic hull (Figure 24).

Before making the templates from the body plan, draw in the height of the hull block by extending the height of the block from the profile plan across to the body plan. This line will be parallel to the base line at the bottom of the keel, and at right angles to the center line.

Now you're ready to make the tracings for the templates. There are 22 in all for the VICTORINE — that includes the bow and stern templates

Be aware that not all tracing papers are alike. The more inexpensive brands have a tendency to wrinkle in damp weather. It's recommended that you try to obtain K & E's Albline® tracing paper which comes in pad form and is available through most good art supply houses. It has good transparency and is very stable. A small 8" x 10" pad should last through several models, and is worth the extra cost Each tracing should contain as much information as possible about the external parts of the hull that particular station touches

Figure 23 shows the midship template for the VICTORINE. Note that the portion of the template above the underside of the cap rail will be used for shaping the rough hull and once that's done that portion will be trimmed away

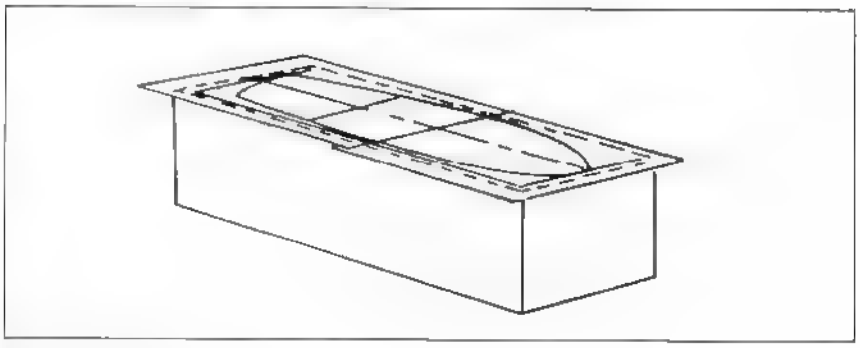
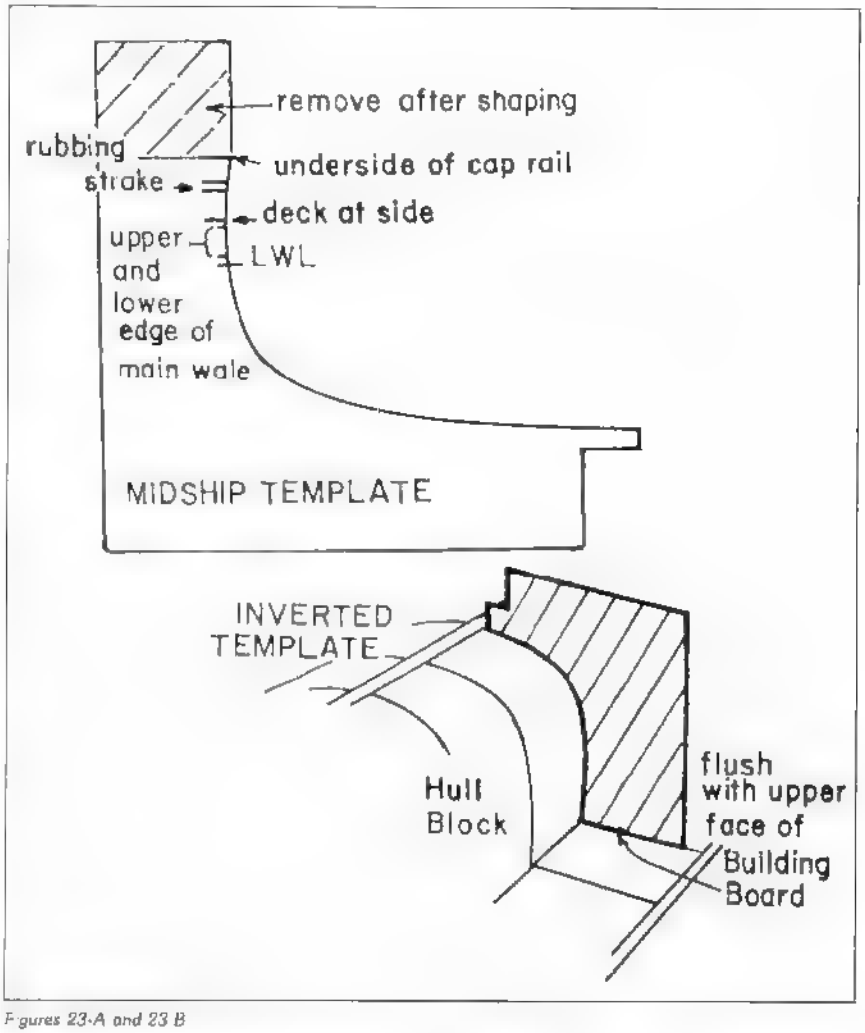


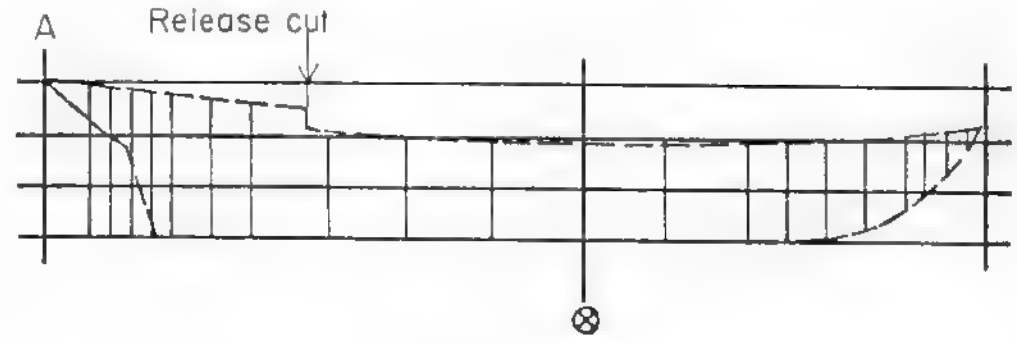
Figure 21

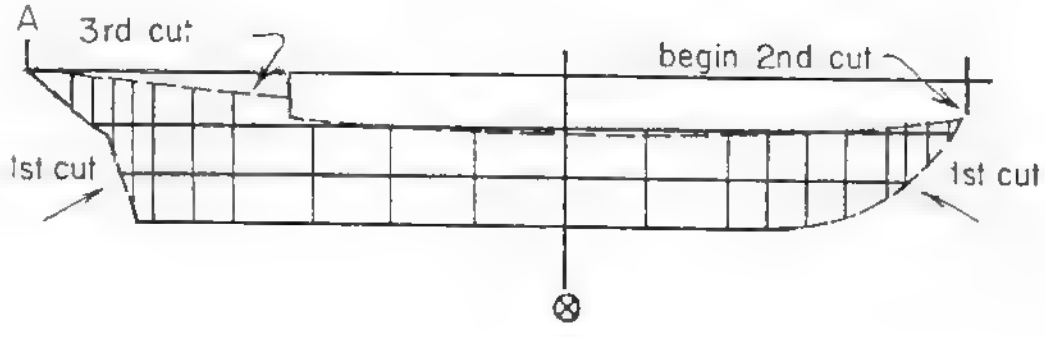


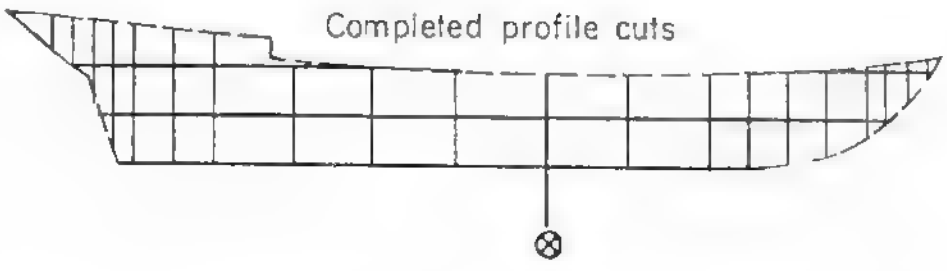
Figures 23-A and 23-B

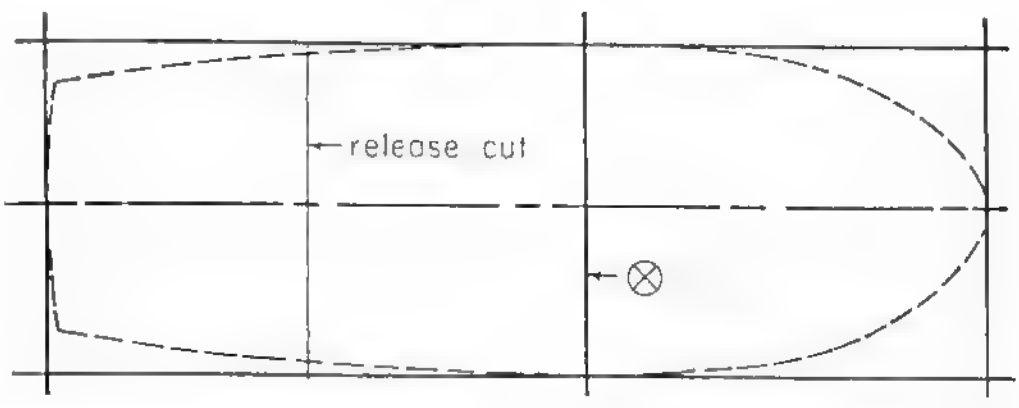
MOUNTING THE HULL BLOCK ON THE BUILDING BOARD

After tacking back the deck portions to the hull block that had been cut-off earlier, pilot holes for mounting should be drilled through the building board and the upper side of the deck. The best way to locate where these should be is to mark them on a tracing of the extreme breadth Then, transfer these marks to the hull









Figures 22-1, 22-2, 22-3 & 22-4

block and board. The pilot holes should clear the cross braces underneath the building board.

Before you mount the hull block you may want to add another brace on the underside. This one would run down the center between the cross braces and would be the same height as the braces. This brace will allow you to clamp the board in a bench vise while you work on the hull block. Ideally, it should be screwed to the bottom of the board (Figure 25) for security.

After the hull has been shaped, it is released from its inverted position on the building board. The building strip is bolted to the board and then the hull is positioned by matching the mid-ship line on the hull with that on the strip, and then clamped securely.

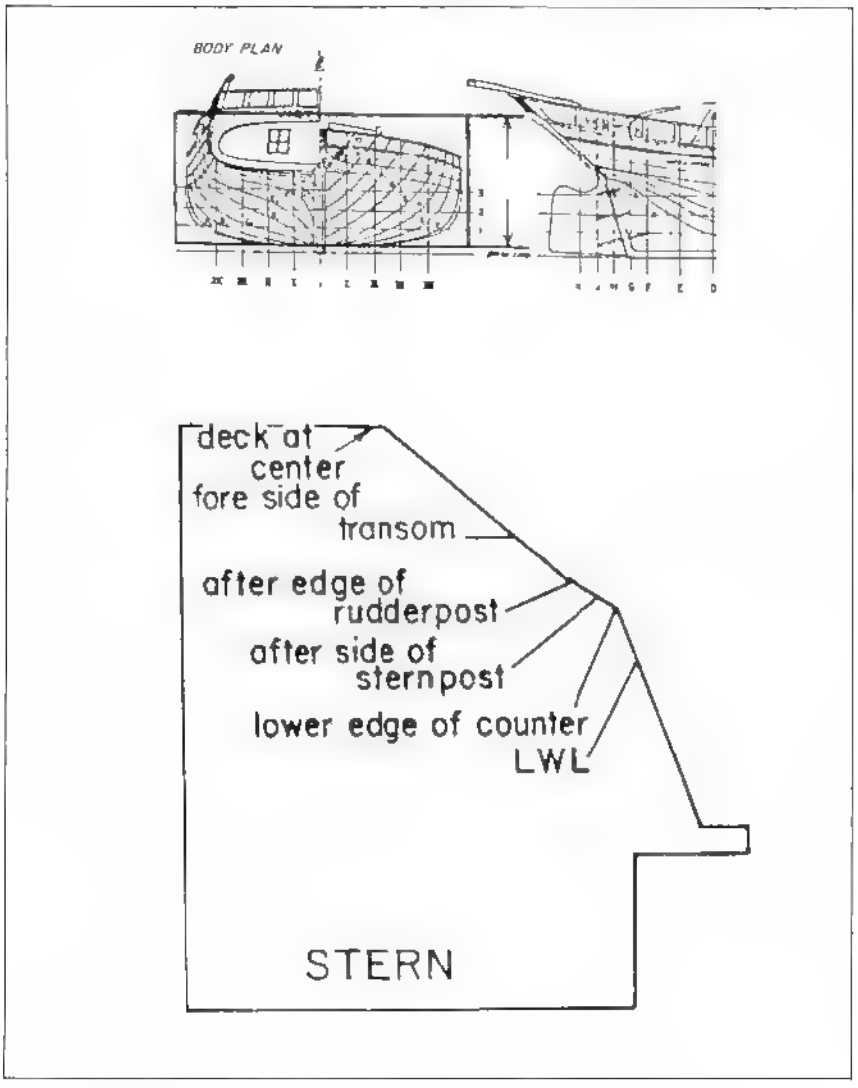


Figure 24

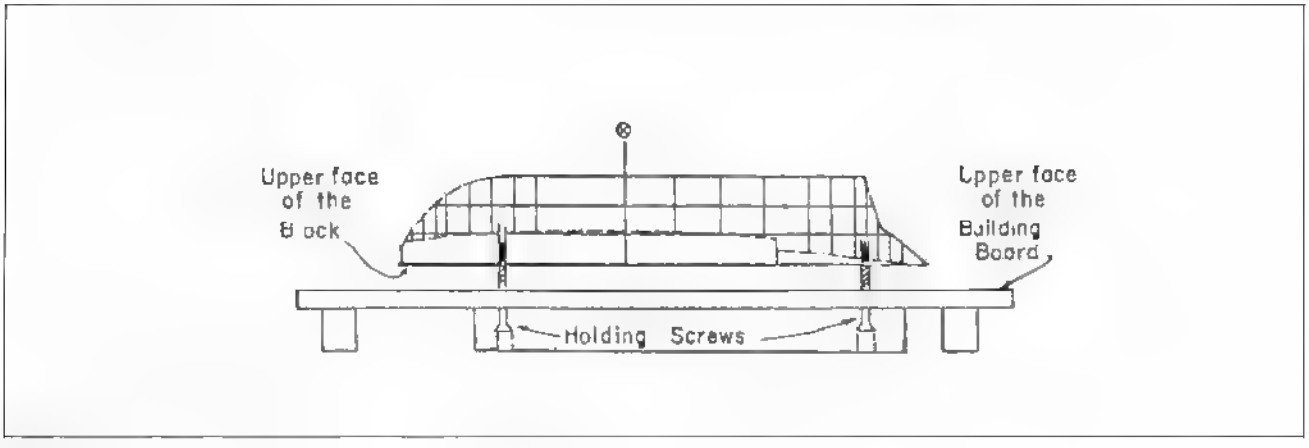


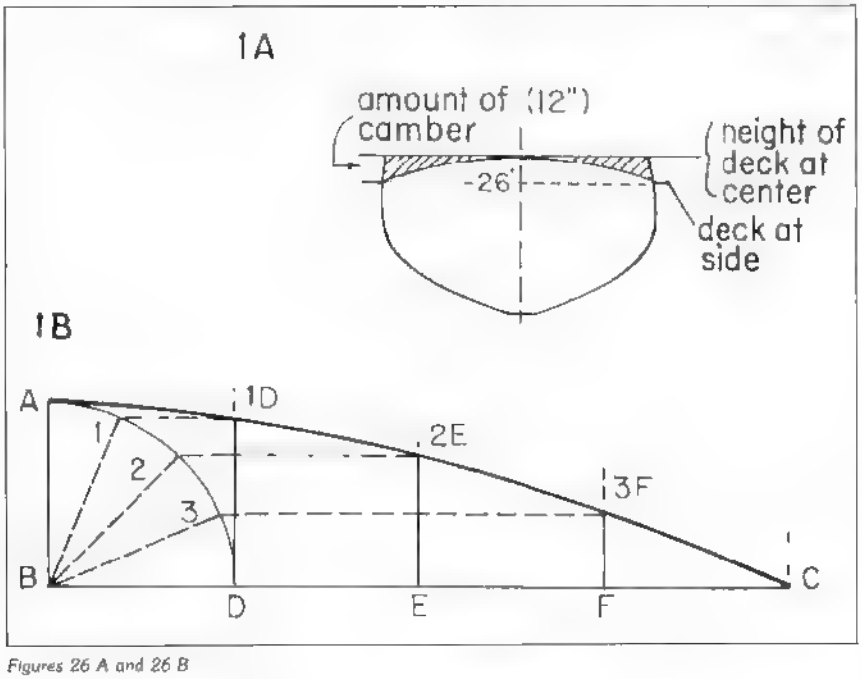
Figure 25

18

Shaping The Deck

The last area to be shaped on the hull before any of the details can be started is the deck. The curve or camber of VICTORINE's deck at mid-ships is shown in the plans

Deck camber can be defined as the difference in height between the center of the deck and the sides If the shape were not shown, this difference in height would have to be worked out as in Figure 26 B



Figures 26 A and 26 B

Figure 26 A demonstrates the difference in the deck height

The extreme breadth of the VICTORINE's deck was 26'. The difference in the height is 12". The classic method for working out the curve is shown in 26 B. Keep in mind that the example shown has had the horizontal measurement foreshortened to save space but the principal is the same. Only half the curve needs to be worked out since both sides are the same

However, if you were working this out for yourself, you would have to have the horizontal line in scale with the vertical line AB. This line (AB) represents the height of 12" — the horizontal line BC is half the width of the deck or 13'. An arc of a circle is drawn in equal to the height AB. This arc is divided into four parts by lines 1, 2, and 3. The line BC is also divided into four parts and vertical lines D, E and F are drawn at right angles to it

Parallel lines are drawn from the arc of the circle out to meet vertical lines D, E, and F, beginning at 1 D, then 2 E and finally 3-F. A curve is then drawn beginning at A, through 1-D, 2-E, 3-F to C. This gives you half the curve of the deck.

Once you have the shape of the deck camber, templates can be made from light weight cardboard for every other station along the length of the main and quarter deck (Figure 27). Begin by making the template for the mid-ship section and work fore and aft from there. As you approach the ends of the hull, the templates will not be as wide, and the curve will also be less.

The next step will be to mount the hull on the building strip of the building board and then to level it (Figure 28). Temporary chocks the height and width of the keel should be tack glued to the keel area, and corresponding supporting chocks should be glued to the building strip to steady the hull prior to installation of the keel assembly (Figure 28-A). These chocks on the hull will be removed later. Use a small carpenter's level to square the hull to the board, then clamp two padded angle irons (one each side) to hold the hull firmly in position

In Chapter 17, I wrote about making the templates for each of the stations and the importance of marking as much information as possible on each of them Those markings that should appear on the midship template are shown in Figure 29

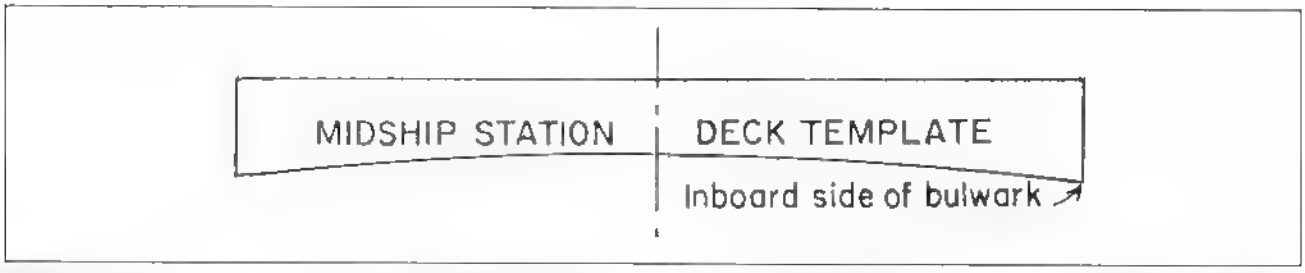


Figure 27

The sheer or profile plan indicates the deck height at the center and upper and underside of the deck at the side down the length of the hull

The upper side of the deck is shown with a long dashed line on the plans and the underside of the deck with a short dashed line It is the position of this short dashed line at every station that must be marked on the side of the hull. If the station lines are missing on the hull they should be restored from the bottom of the main wale up to the edge of the deck

An easy way to do this is to use 1/16" wide flexible drafting tape as a guide for marking in the station lines. The stations will still be on the surface of the deck and at the keel area on the underside of the hull. Mark short ticks on the side of the hull at the deck level. Take a length of tape and apply it between the keel and the deck Use a sharpened soft pencil to draw in the lines so as not to mar the hull surface

Once these are on, the hull can be repositioned on the building board and the station lines lined up with those on the building board. There will be a number of occasions when you will want to remove the hull from the board, so I suggest you install a small chock at the back end of the after keel chock, temporarily. This can be removed later after the keel is installed and replaced with a permanent chock. The underside of the deck at the side can be marked on the sides of the hull (Figure 30).

Removing the excess wood from the edges of the deck is best done with a course bastard file, working from the edge towards the center. The deck templates will indicate when you are getting close to the proper shape. At that point, you can switch to a finer warding file. Keep in mind that the stations on the deck will have to be replaced as you go along

At the center remove about 1/32" (the thickness of the deck planking). If you work at every other station line to get this right you can then blend in the alternate stations to match. Very little sanding should be done because you will want a good slightly roughed up surface on which to glue the decking material

CUTTING THE RABBET FOR THE BULWARKS

On the VICTORINE the bulwarks are applied after the deck has been installed This requires cutting a shallow rabbet around the main deck and back about 3/16" into the side of the quarter deck (Figure 31).

The bottom of the rabbet follows the line of the top edge of the main wale Like the underside of the deck at the side, this location must be marked at every station on the sides of the hull

Once the main wale is installed the seam will be covered. The depth of the cut for the rabbet must be marked on the surface of the deck, break of the deck and practically onto the quarter deck. The depth of cut is 3/64". Use flexible drafting tape again or you can measure the distance on each of the station lines and mid way between each of those

Cutting the rabbet is best done in stages using thin cuts and alternating between the top surface and the sides I suggest using the #11 X-Acto blade for the job. It allows you to see what you're doing because of its taper, yet it is stiff enough to remain rigid during the cutting process

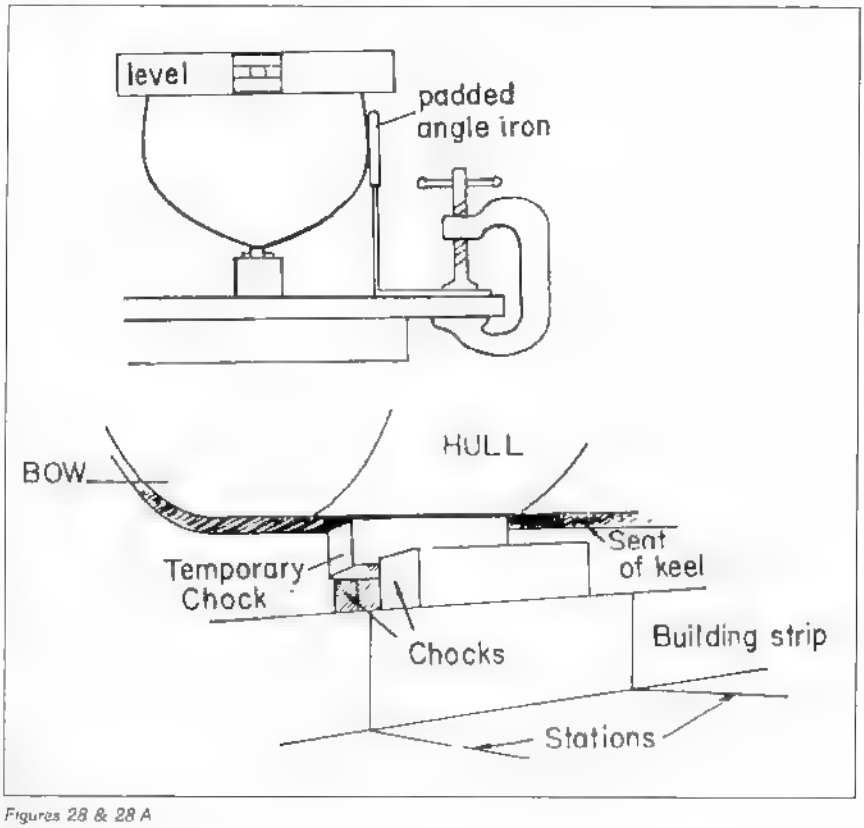
One of the handiest tools I've found for cleaning out these narrow rabbets is a thin flat warding file used by auto mechanics that is about 4 1/2" long They can be obtained in thicknesses beginning at 1/32" and 1/16". The 1/16" file is best for this depth of cut since it goes beyond the depth of the cut and therefore will not create a ridge you would have to get rid of later on.

After cleaning out the rabbeted area, restore the station lines You will need their positions later on after those on the deck are covered with the deck planking. A small 4" plastic triangle can be used to redraw them

PREPARATIONS FOR PLANKING THE DECK

Before work on the deck planking can begin, it's important to cover the end grain at the break of the quarterdeck with 1/64" sheet stock. Make a pattern for this area from tracing paper, cut roughly to shape and pressing it against the break of the deck to get the curves of the main and quarter deck

After trimming the pattern to shape, rubber cement it to the sheet stock The



Figures 28 & 28 A

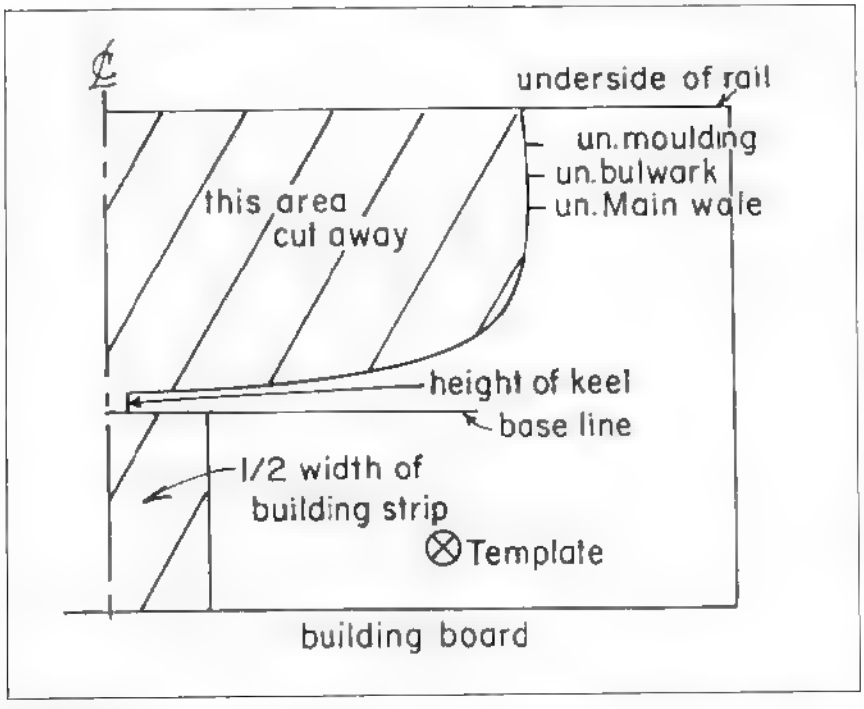


Figure 29

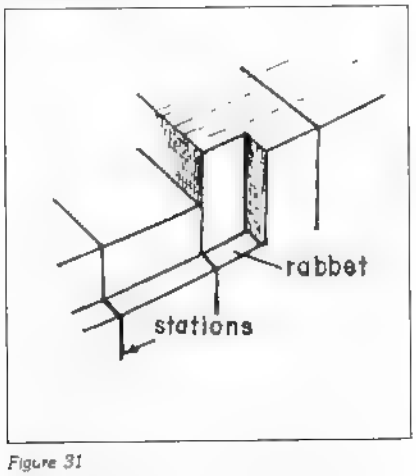


Figure 31

top edge should be cut to the outside of the line so that it can be filed flush with the surface of the quarter deck after the section is glued onto the break. Paper patterns will also be required for the margin planks that run down both sides of the main deck, quarter deck and across the transom. Two patterns of the transom are needed because the taffrail above the transom follows the same curve. When preparing these patterns, allow for a little extra around the edges to crease back (Figure 32). The tracing paper can then be smoothed out again and a pencil line can be drawn in on the sharp crease line. Use narrow strips of tracing paper for the edges of the quarter deck and mark which is port and the starboard sides. This should also be done for the main deck area.

The main deck tracing should be split down the middle and trimmed on the inboard edge for easier handling and placement on the sheet stock. The main deck margin plank butts against the break in the quarter deck and is butt jointed against its mate for the opposite side at the bow. The joint there will be covered by the bowsprit. Because of the sharp turn at the bow it will be impossible to get the grain running completely fore and aft but you will be able to shift the tracing some to lessen this effect.

Cut the outboard edge first from 1/32" stock. The margin planks are all the same thickness as the deck planking, but the width of the margins is 3/16". To draw in this width on the margin planks, pick up an inexpensive school grade compass and file the pointed tip flat on the inside (Figure 33). Use sandpaper to sharpen a wedge point on a soft pencil and set the distance for 3/16". Place the rough cut main deck margin plank on a flat surface. With the filed point touching the clean cut outboard edge, run the compass down the length of the plank. Repeat for all but the transom planks. Both of these should be cut 1/4" wide. The transom plank (Figure 34) must be beveled on the outer edge to match the bevel on the face of the transom.

The taffrail has a slight bevel on its inner edge and its corners curve slightly. In both cases only the inner curve is cut at this time. The bevel on the transom piece should wait until that plank has been installed. The bevel, however, can have the outboard edge drawn in.

Before leaving the subject of the margin planks, let me add an additional detail. I mentioned earlier that because of the bow curve the grain of the wood would change to short grain which will increase the danger of splitting off. You might want to scarf in two sections around the curve for a more realistic effect. Constructing the margin plank in this manner will also allow you to use straighter sections of wood.

Where the scarf is formed, you will need at least an inch of overlap. Rather than let the plank come to a sharp point at the ends it is nibbed or cut off in this case 1/32". At the other end of the scarf it is jogged back 1/32" and a diagonal line connects the two (Figures 35-A & 35-B). The straight section that runs forward from the break in the quarterdeck must first be glued into position. The curved section to be lapped is supported underneath with a piece of scrap (35-A) and held firmly while the excess is cut away (35-B).

The X-Acto knife can then be used to scribe in the scarf area on the plank portion below. The loose section is removed and set aside while the excess wood on the lower plank is cut cleanly away. Repeat the process for the next section of curved plank, after installing black paper for the

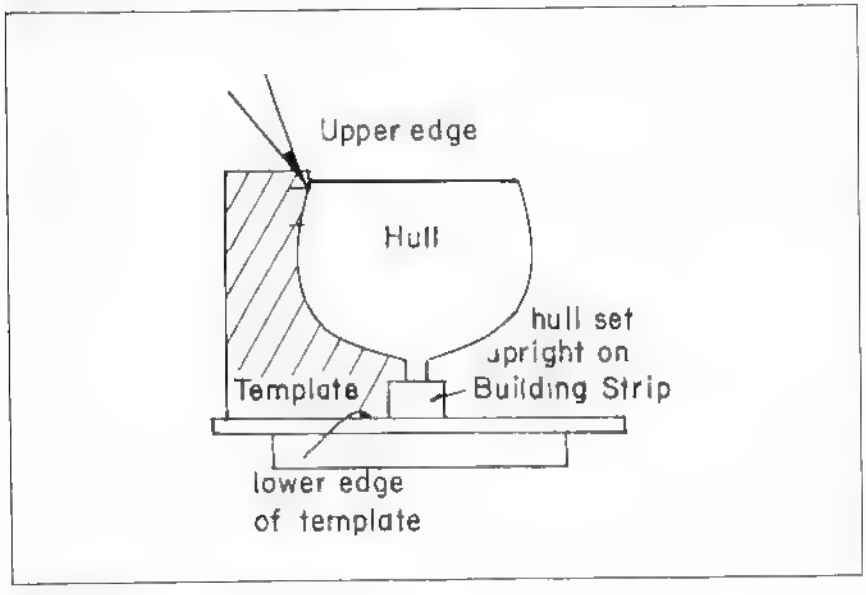


Figure 30

caulking at the joint

The next step would be to bore the holes for the mast and rudder post. A template which gives the rake of the mast is essential (Figure 36). The location of the mast hole is taken from the deck plan and its diameter from the inboard profile. It's a good idea to mark in the station lines on both these sections of the plans in colored pencil for quick reference.

Once the diameter of the mast has been drawn at the center line of the deck you can begin to bore pilot holes. However, first tape the template for the rake of the mast securely to the surface of the deck at the center line. You may need to have someone hold the model steady for you, as you get closer to its full diameter Use an eggbeater type of drill, so that you can proceed slowly. The same will be true of boring a hole for the rudder post

If you want a working rudder you will have to bore all the way through from both directions, the deck and under the counter. This location should be marked on the stern template (between station H & J). This hole should also begin with small pilot holes gradually increasing to full size The best way is to leave both these holes slightly undersized until the rudder and post are fitted on the model for a snug fit. The mast hole can be made a little oversized and wedged around the base so that its center is 90° athwartship to the base line. In any case the hole at the counter must be bored prior to fitting the sternpost.

The final preparation for installing the decking is to layout all the deck furniture On the main deck it begins with the small hatch foreward of the mast, then the two hatches and centerboard trunk. On the quarter deck there is only the ladderway that needs marking and we can move on to installing the keel stem and sternpost

KEEL STEM AND STERNPOST

Basswood will be used for the decking material and due to its soft qualities it is very easy to dent in its unfinished state This tendency is diminished some after a few coats of varnish or Val-Oil® but it is safer to complete the hull assembly on the underside before laying the deck

The shape of the keel, stem and sternpost is shown on the profile or sheer plan The width and taper at the ends is shown on the body plan. Both the stem and sternpost are reduced to half their width or 3/32" and this taper is carried slightly into the keel at the stern and to the lower edge of the forefoot of the stem up forewarc. The stem is scarfed to the keel at the bow and the sternpost is butt jointed at the stem All members are cut and generally shaped prior to installation, but only the stem and keel are joined prior to installation on the hull

The length of the keel scarf is 3/8" and it is called a simple scarf (Figure 37) On the stem section it begins at station 4, and overlaps the keel section at that point. The nibbed end of the scarf is 1/32" high The opposite end of the scarf appears to be a point, but that is only because the portion of the stem and keel that would indicate another nibbed end is buried in the hull section. So, visually (and in this case actually) there appears to be a sharp pointed end to the scarfed section. The joint between these two sections is protected on the underside by the false keel or shoe, a thin strip of wood the same width as the keel but 1/32" thick

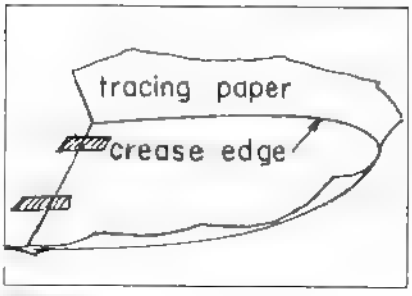


Figure 32

Begin by cutting out the shapes of the stem and sternpost from a length of 3/16" thick by 2" wide sheet stock. Basswood can be used for the whole keel assembly On the stem portion, allow a little extra length at the keel portion for cutting the scarf. On the sternpost, allow extra top and bottom. Both the sternpost and stem should have the center line drawn on their outboard edges and their width marked on each side of the center line. Make careful tracings of these sections and remember to mark the two holes for the bobstays on the stem These appear just above the LWL on the plans

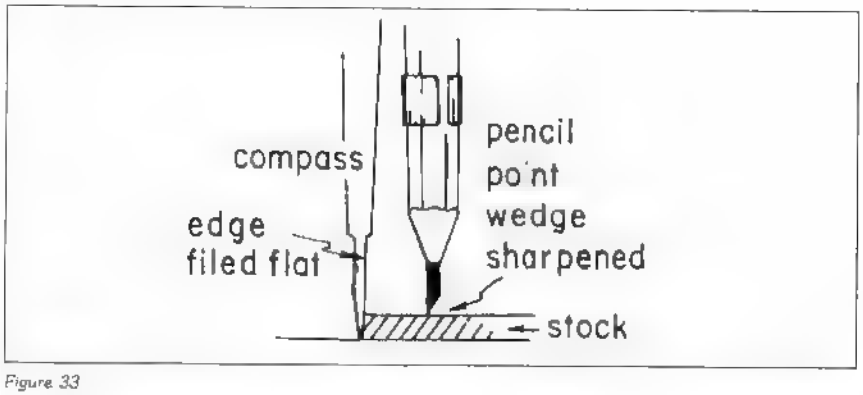


Figure 33

Cut the stem first and stay to the outside of the line especially on the curved portion that will fit against the bow. You can use a narrow strip of carbon paper between the bow and stem to find the high spots, which can then be removed with a curved needle file. When this area fits well, shape the outboard curves and bore holes for the bobstays using a #54 drill bit

Carefully mark out the shape of the scarf on the keel portion of the stem Clamp the scarf section in a vise so that the diagonal line is parallel to the upper edge of the vise jaws and file flat with a warding file. Lay the stem on a flat surface so you can taper the front edge with the file. Work front to back, but remember to bore for holding pins at the center line just below the bobstay holes and under the forefoot before you begin tapering A fine straight pin should hold the stem securely.

As you approach the line, set aside the file and switch to fine sandpaper using a circular motion. Repeat for the opposite side Finally place the stem in position on the hull and mark where the bottom of the rabbet occurs on the inboard edge of the stem and file in a slight bevel that will hold the bulwark when it is installed (Figure 38) Set the stem aside and go to the sternpost.

Aside from tapering the sternpost, it must be beveled on its outboard edges so the rudder can turn 45° both to port and starboard (Figure 39). Most of the taper at the stern is taken up by the rudder blade with very little of it on the sternpost itself After making a tracing of the sternpost's shape, include the position of the gudgeons. You will want to bore for holding pins (lill pins) along the center line of the sternpost between the gudgeon locations

To assure a good fit under the counter and for some added security make a small shallow cut-out to bury the upper end of the sternpost in the counter. The outboard edges below this point should be beveled from a point 1/32" from the center line Once the sternpost is glued and pinned in position the lower edge can be filed off flush with the seat of the keel on the hull

Following next is the work on the keel Select a straight section of stripwood

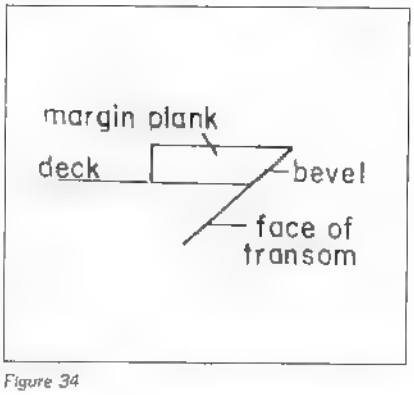
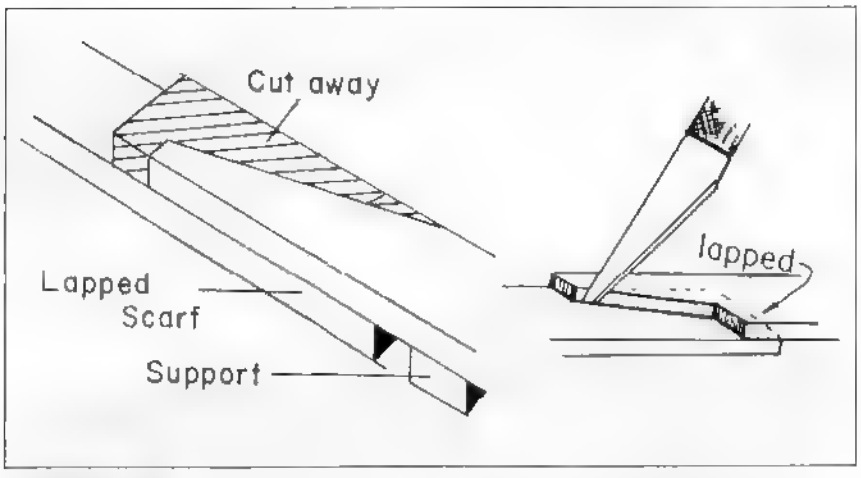


Figure 34



Figures 35-A & 35-B

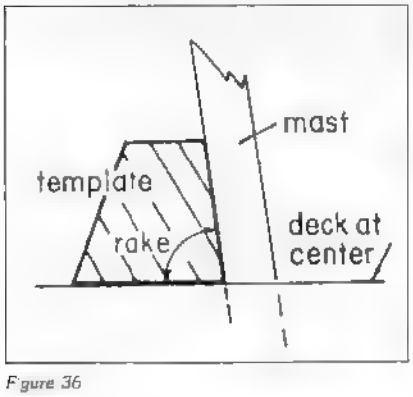


Figure 36

3/16" x 3/32", a little longer than indicated on the plans just in case you may have to recut the scarf. Use the X Acto blade (#11) to scribe the shape of the scarf. Make the short cut with a razor saw, then clamp the keel section in the vise and file along the diagonal line as before.

After you are satisfied with the fit between the keel and the stem, lay both sections on the plans and mark off the location of the centerboard on the side of the keel. A slot is cut through the keel, 1/16" wide, to hold the centerboard. This slot must also be cut through the false keel, so be sure the marks remain on the side for the slot until the false keel is installed.

Once the slot is cut and cleaned up with a needle file, the keel can be joined to the stem at the scarf. The joint should be glued and pinned before the whole assembly is glued to the hull, and pilot holes for lill pins should be bored down the length of the keel and their location lightly marked on one side of the keel. You will have to bore for mounting pins and don't want to run into any of the holding pins that secure the keel to the hull later on.

Pins should be inserted at the stem and keel prior to gluing so that they can be tapped in as soon as the assembly is placed against the hull. The end grain at the bow will soak up the glue rapidly and will probably require two coats to keep it from drying out before the remaining sections.

Apply glue to both the keel assembly and the hull and allow both to become tacky before joining them and driving in the pins. Have a damp rag handy to wipe off any excess glue that squeezes out of the joint. Give the glue 24 hours to dry before clipping off the ends of the pins and applying the false keel.

Use 3/16" x 1/32" strip wood for the shoe or false keel and cut it a little oversized in length so that the ends can be filed flush with both ends of the keel.

Again, mark in a center line on the bottom of the keel, locate and then cut through the slot for the center board. Also mark the position for the mounting pins then bore pilot holes gradually increasing in diameter to 1/16".

If necessary, remark the position of the gudgeons on both sides of the sternpost for later reference. The temporary chocks on the building strip can be removed and a temporary stop installed (Figure 40) until after the rudder is installed. Although the rudder isn't installed until after the deck has been laid, it can be built now if you like.

BUILDING THE RUDDER ASSEMBLY

A plug stock rudder post is the type that was used on the VICTORINE. This was an improvement over the old square rudder stock which tended to rot out more quickly in spite of the canvas coat nailed over the opening in the hull and post below. Water still managed to seep in and collect there doing considerable damage.

The rudder blade and post are made in two sections, one for the blade and the other for the post. If you plan a non-working rudder, the post section will be cut in half and only a portion of both halves will be used (Figure 41 A). The diameter of the post at the plug where it enters the counter is 3/16" and it tapers to about 3/32" (41-B) where it joins the blade. At its upper end the post is squared off slightly above where it comes up through the deck and its four sides are padded out to support the mortise cut through it for the tiller arm (41-C).

The hole made in the deck is covered by a deck pad 1/32" thick and the square portion of the post should begin 1/8" above that level. The post should be made from 3/16" square stock cut a little longer than required on the plans. On two opposite sides drawn in a center line and continue it onto the ends. This will give you a fore and aft reference point which is very difficult to do if the post had been made from a round dowel.

At the center line on one end cut a 1/16" slot down about 1/4". Make a tracing of the shape of the post from the sheer plan and include the line of the counter. Transfer this to the square stock at the slit end on both of the flat sides, then file off the excess on the lower end. If a working rudder blade is planned then the square stock should be placed on the plans in line with the rake of the rudder post and the point where it comes through the deck should then be marked on the side. Above this line another is drawn 1/8" higher — following the line of the deck.

A mortise needs to be cut through the head of the post to take the tenon of the tiller arm. The best way to do this is to work from two sides, one forward, one aft. The mortise is 1/32" wide and 3/32" high. It begins 1/32" above the top line drawn in. Cutting the mortise will be easier if holes are bored at each end of the mortise on both sides and then clearing the wood between with an X-Acto blade.

The head of the rudder post is cut diagonally in line with the deck, then trimmed off 1/32" making the head 1/8" square. Below this point the stock is rounded to fit the hole for the rudder post. The fit should be an easy one and the post

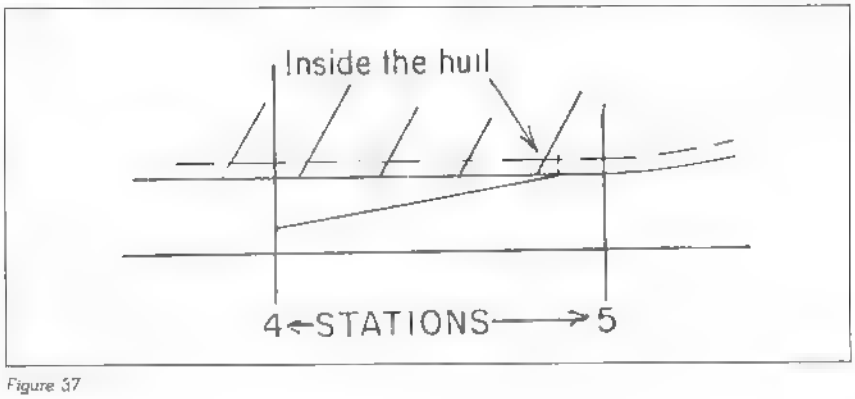


Figure 37

Photo I

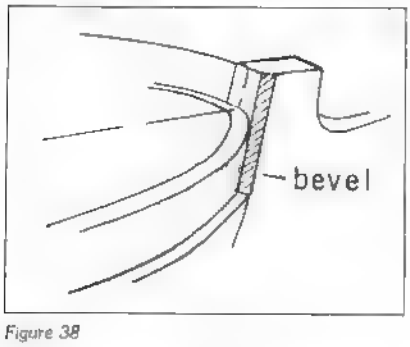


Figure 38

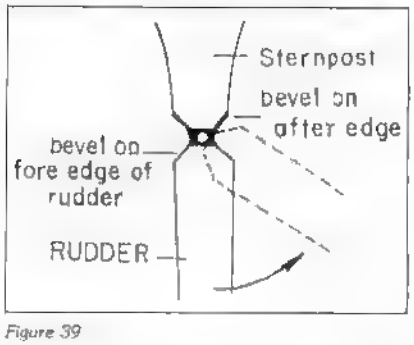


Figure 39

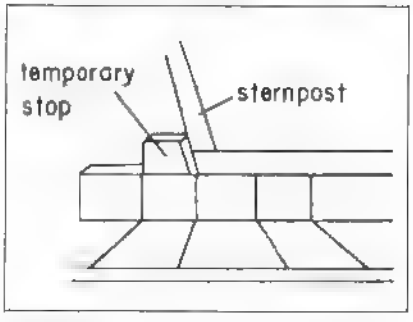


Figure 40

should move smoothly. If necessary you can clear any roughness within the hole with a round needle file.

Before cutting the rudder blade, make a tracing from the sheer plan. Rubber cement this to the 3/16" stock with the grain running fore and aft. When you cut out the blade leave stock on the upper fore side to make the tenon that will fit the lower end of the post as seen in Figure 36-A. On the tracing include the shape of the lower end of the post.

After the blade is cut out, draw a centerline on all the edges. The blade tapers to 1/16" at the back end from slightly over an 1/8" at the fore side. The tenon is 1/16" wide and this is cut first before tapering. Its lower boundary is the shape of the lower end of the post and this must be marked on both sides of the blade. Use the X-Acto knife to cut off this portion of the tracing then peel off the tracing carefully and re-apply it to the opposite side and again lightly score the shape onto the blade, then remove the tracing. Mark the 1/16" width of the tenon on the upper top corner then carefully slice away the excess until you have a good fit onto the end of the post.

Mark the 1/16" width of the taper edge of the blade and work the taper foreward from there. Give both sides a fine sanding and then file on the bevel at the fore edge. The final shaping to the end of the rudder post is done after it is glued to the blade. File it until you get a smooth cone shape with a slight bulge as on the plans, then give it a light sanding.

Make another tracing of the blade for the position of the pintles and transfer these positions with carbon paper. Use the edge of a fine flat needle file to make shallow grooves at the pintle positions. These will give a firm seat for the pintles and prevent them from shifting during installation.

Below each of the pintles is a cut out curved area occupied by the gudgeons on the hull but it's best to wait until the pintle straps have been installed before cutting these out.

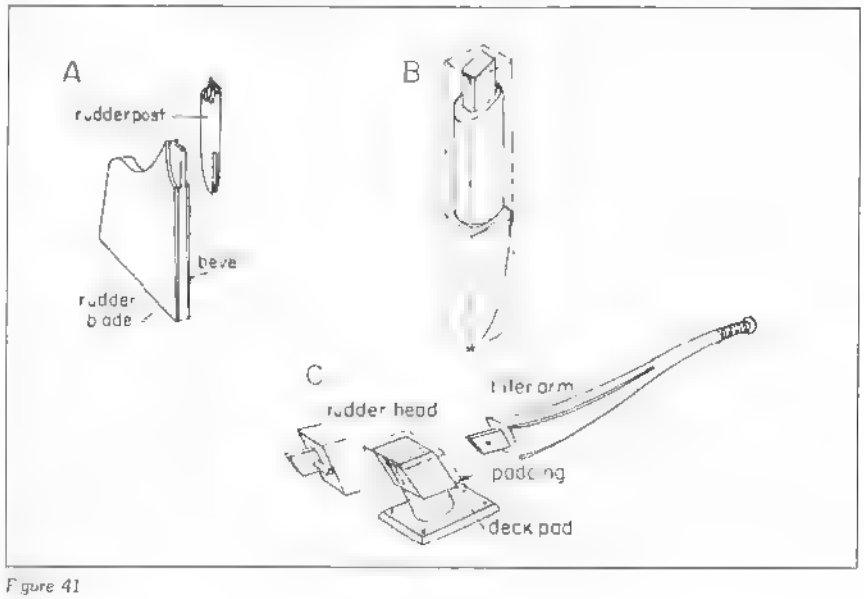


Figure 41

19

Laying The Deck Planking

Now that preparations have been made for installing the bulwarks and the margin planks have been installed on the deck work can begin on laying the deck planking. You will find the end result more than worth the extra time required and good experience for future models.

If this were a plank-on-frame model complete with deck beams, ledges and carlings, it would not be difficult to decide where to place the butts, or joints between the planks. With a solid hull model the builder has to work that out for themselves in the best possible way. Planking is governed by the number of planks between butts on the same deck beam. The number of planks can be three or four and they are called either three- or four butt planking (Figure 42)

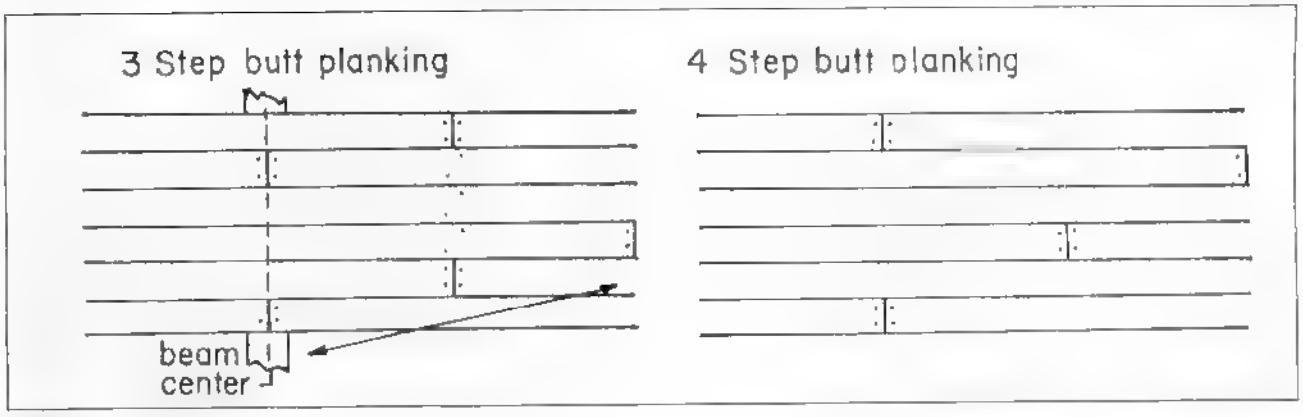
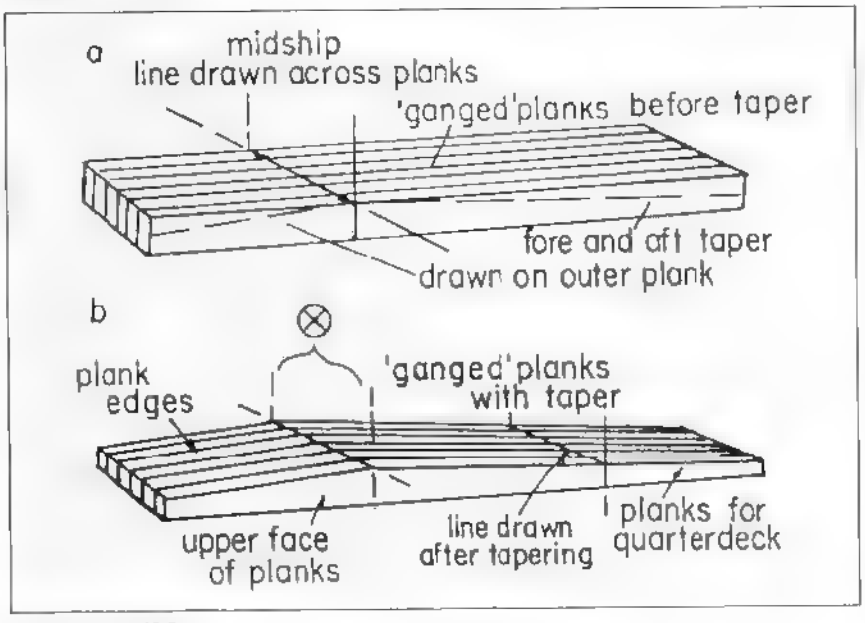


Figure 42

The butts are centered over the beam and are double pegged on both planks. The planks between the butts are also pegged, but these have the pegs staggered and offset from the centerline. At this scale the planks on the decks of the VICTORINE make it impractical to use treenails, the name for these pegs. At mid-ship the scale width of the deck planks is 7/64" so you can see why the treenails would almost be invisible.

To give realism to the deck, black paper is used for caulking at the butts and between the planks. But, before this is used, the deck planks must be tapered. On the VICTORINE, the taper begins at



Figures 43-A & 43 B

mid-ship The planks taper fore and aft of this line to about half their width at the transom and 2/3rds at the bow. The taper s cut on one edge only.

The first step is to cut all the required lengths needed Measure along the center line from bow to stern for the length. The number of planks required can be taken from the plans. Basswood strips 1/32" x 7, 64" are used for the planks and these should be sanded on one side after they've been cut to length

The most efficient way to taper the planks is to do several at one time. This method requires marking the edges of the planks for the midship line, and drawing the shape of the tapered plank on the two outermost planks (Figure 43-A) To keep the planks from slipping while they are being marked and later filed to shape, they should be tack glued with rubber cement Facing sides should both be cemented Later they can be separated with a little rubber cement thinner The group of planks can then be clamped in a vise and shaped with a file. Work from the mid ship line out towards the ends using the shape drawn on the outer planks as a guide After tapering the planks, give them a light sanding with a sanding block to remove any burrs

Next, mark the location of the break in the quarter deck (Figure 43-B). Here the quarterdeck planks are separated from the rest of the group by slicing through the planks with a single edged razor blade

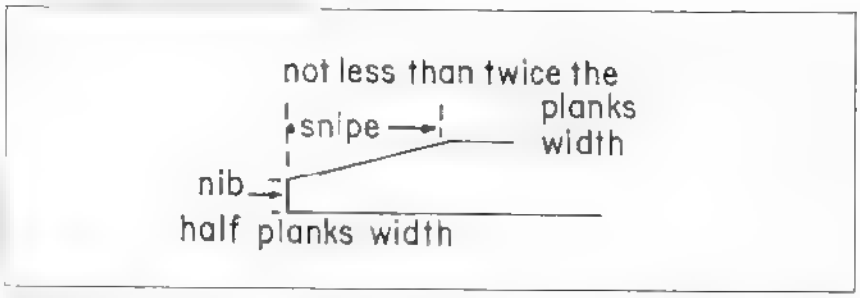


Figure 44

After separating and cleaning up the planks they can be stood on edge and glued to the black paper. The best type to use is photographic paper You can probably obtain this from your local portrait studio. Next best is scrapbook filler sheets which are slightly heavier and fiberous. If you must use these, sand one side and it will help control the fuzz. The planking strips should be glued a few at a time

As you gain experience with this step you'll be able to do more at a time. There should be a little bit of space between each of the planks so that you can easily get an X-Acto knife blade between them (Photo 2) If you use Titebond glue you will have about three minutes before the glue sets so there will be time to adjust any plank that needs to be moved. You might also want to cut some strips of black paper 1/32" wide to use between the butts and at the edges of the margin planks

Make sure you have all the locations of the deck furniture marked on the surface of the deck before beginning to lay the planks The center line and station lines should also be clearly defined. The station lines will act as a guide for your butts

Begin planking at the center line of the quarterdeck and, after you have installed the first plank, clear the hole for the rudder post. Work first one side and then the other. Use a single edge razor blade to cut the planks' butt ends, then glue on a strip of caulking paper

Because you will be gluing several portions of single plank in the next run you'll want to keep them perfectly aligned

To do this, take another short length of strip wood to use as a wedge against the run of planking just laid and pin it securely until the laid planks have dried enough to hold. As you work towards the sides another planking rule must be used The ends of the planks will begin to run into the margin plank. The ends cannot

Photo 2

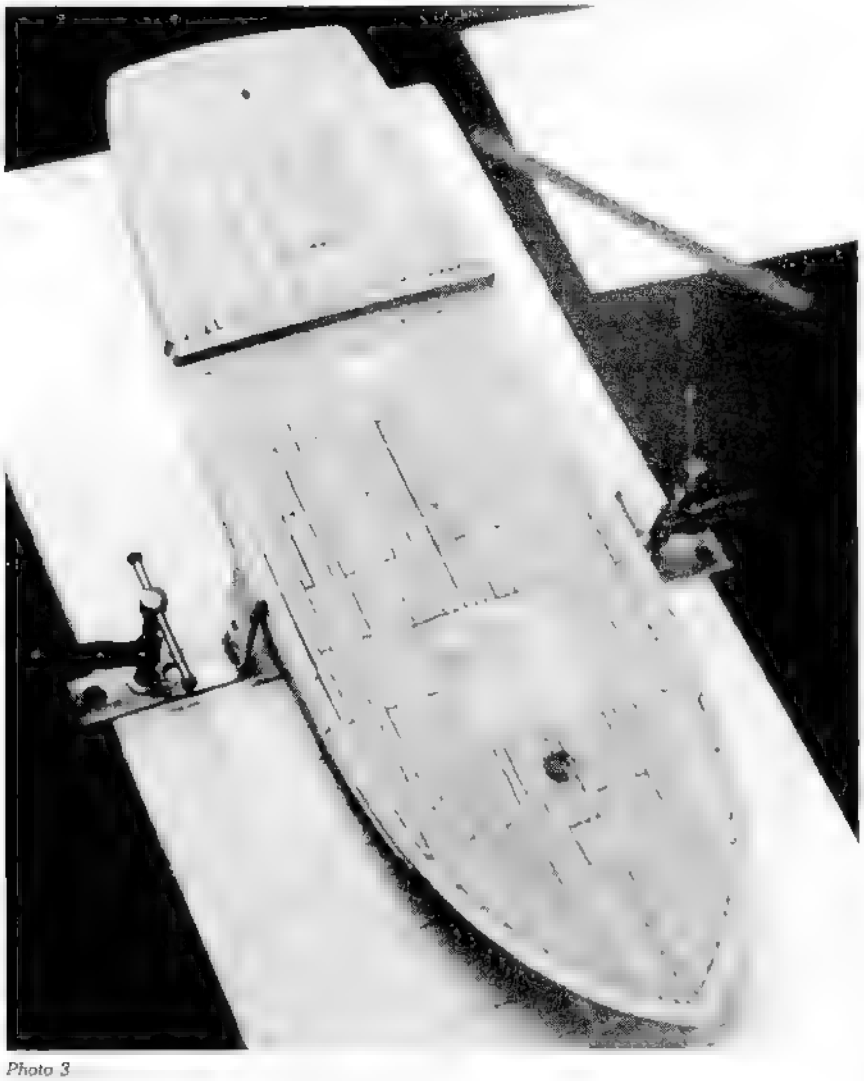


Photo 3

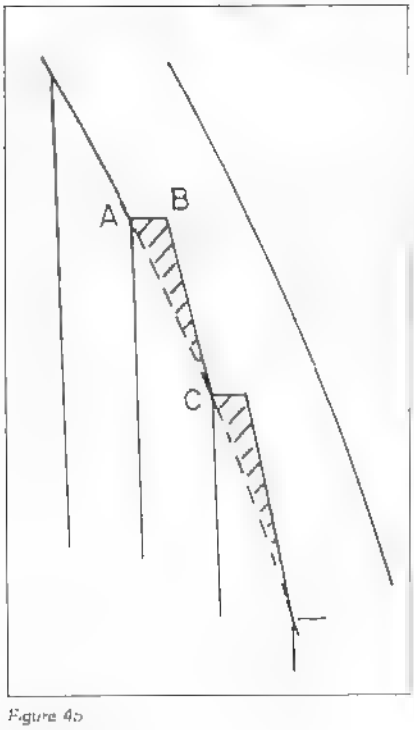


Figure 45

be cut off with a sharp point. Instead, the ends of these planks are nibbed into the margin plank. The nibbed end is half the width of the plank (Figure 44) and the length of the snippet not less than twice the width of the plank.

In Figure 45, AB is the nibbed portion of the plank, and BC the snippet. The nib AB is cut first, then the plank is laid in position and marked at point C where its edge touches the margin plank. The plank is removed and the angle of the snippet is cut to shape. The plank is then repositioned and the shape of the nibbed portion is scribed onto the margin plank. The shaded area of the margin plank is then removed and the plank glued into position.

As you work along installing the planks, two things will be observed. The first is that you will see a diagonal pattern emerging at the butts. This same pattern will be repeated on the opposite side and this is the reason why it's important to work both sides at the same time. Also there will be an unavoidable build up of excess glue that will squeeze out between the planks as one is pressed up against the

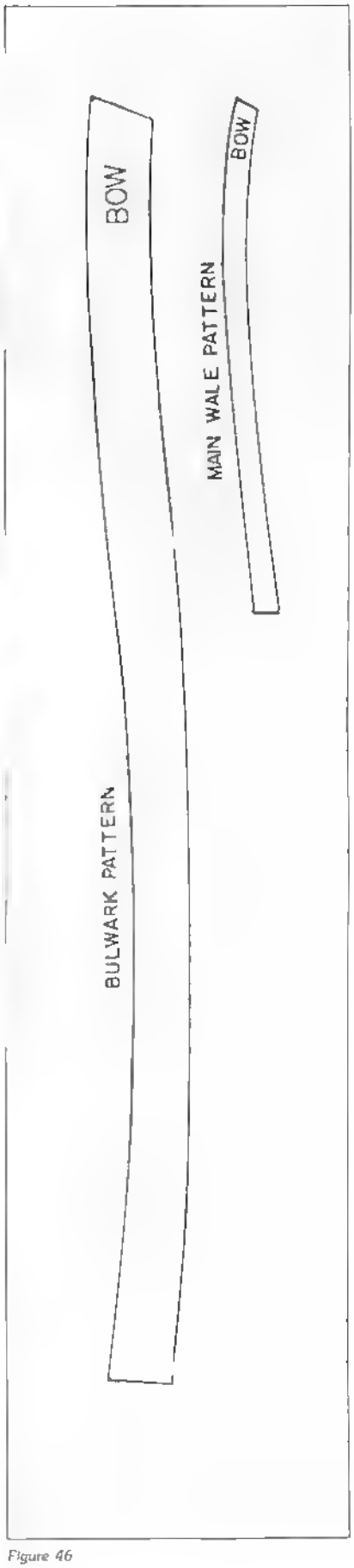


Figure 46

other. The best way to remove it is to scrape it away with a single edge razor held at right angles to the surface of the deck and pulled towards you. This will remove the excess paper without marring the surface of the planks with the black dust that results from sanding

Later on, when all the planks have been installed, you can give them a light sanding before putting on a coat of Val Oil without worrying about this dust factor. The completed deck shown in Photo 2 was done by Joe Fransesca, one of the students working on the VICTORINE. Both the deck openings and the station lines are visable. The variation in the coloration of the planks can also be seen I think this lends character to the deck surface as is seen in real ships, rather than the pure white of a holly planked deck, although others prefer to use it rather than the basswood. Joe has used each station line for his butts between the planks giving it quite a realistic effect

The next step will be to install the bulwarks. The pattern for these and the

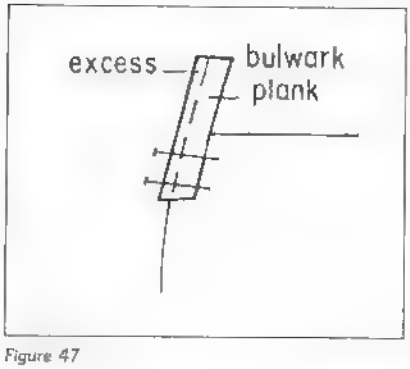


Figure 47

curved portion of the main wale is shown in Figure 46. You'll note that slight "S" shape taken by both. One of the major mistakes seen in models that have been planked using only straight lengths of wood is seen at the bows where the planks take a quick turn around the curve there It shows that the plank has not been "spiled" or lifted off the hull with dividers and transferred to a sheet of paper which will become the pattern for that section

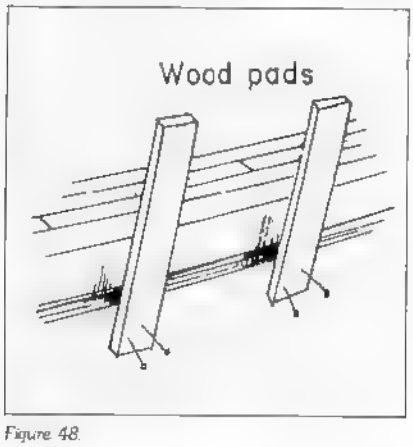


Figure 48

Some years ago I did an article on spiling (*which appears in Takakjian's book, The 32 Gun Frigate ESSEX*), and it warrants re-reading for those of you who would like to know just how to go about this. However, here I have presented the pattern already spiled and ready for use on the hull

The sheet stock used for the bulwarks must be slightly thicker than the rabbet cut because of the curve of the hull (Figure 47). The bulwark is cut and installed and then shaped with a file to remove the excess. The lower portion is filed flush with the hull and the upper edge is reduced to slightly over 1/32" thick to support the cap rail

The sheet stock used for the bulwark sections are 1/16" thick. They'll overhand the 3/32" rabbet by 1/32". Tracings should be made of the bulwark pattern and rubber cemented to the stock, then cut out and sanded. It's a good idea to pre-bend the pieces before trying them in position. I would try heat bending this piece over the soldering iron, but remember to dampen it on its underside To hold the bulwark in position during the fitting and gluing operation, pin some short lengths of strip woodto the sides of the hull

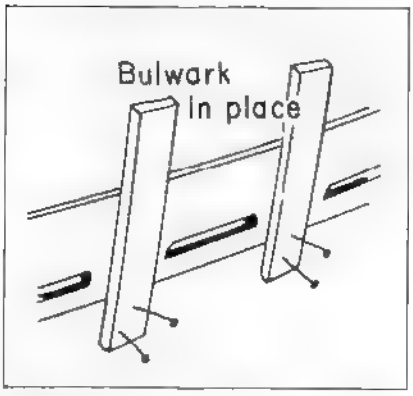


Figure 49

(Figures 48 and 49). Work to get the after end fitted well and bevel the fore end to fit in the rabbet cut at the stem. Once you have a good fit, run a pencil line at the edge of the margin plank inboard This will locate the top of the deck

The scupper holes must now be located You'll see from the plans that the last scupper lines up with the after edge of the center board trunk. Place a small triangle on the centerline which shows in the opening of the trunk area. Its upper edge should be in line with the after edge

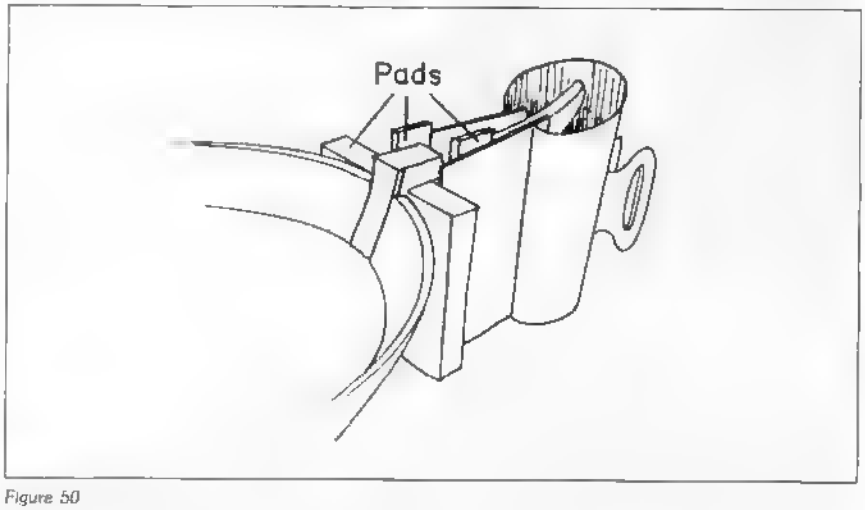


Figure 50

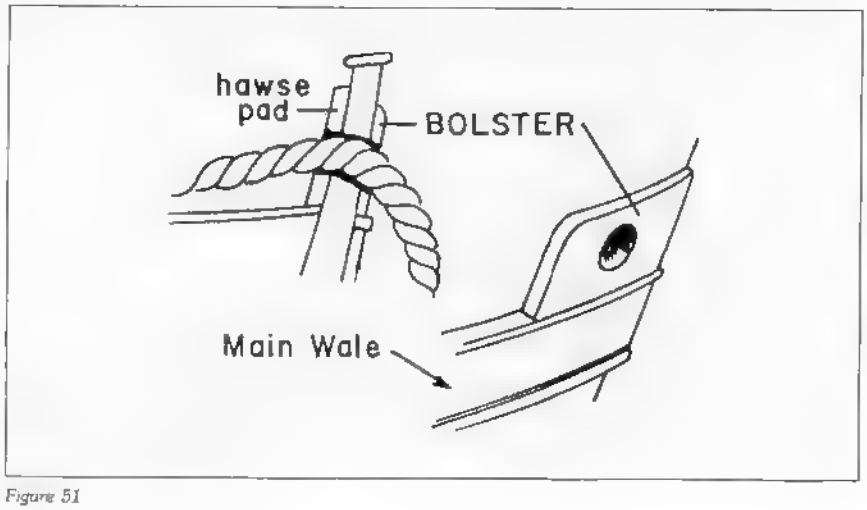


Figure 51

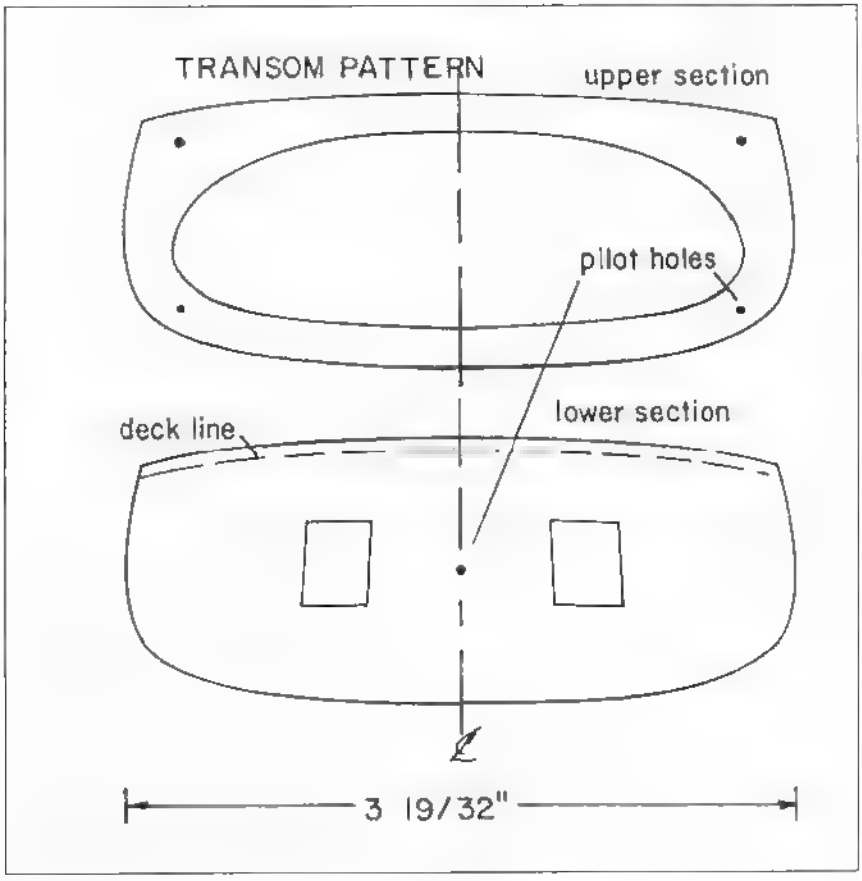


Figure 53

of the opening. Put a light pencil mark at the outer end of the triangle so that you can draw a line between this mark and the edge of the opening. The line must be barely visable so that it can be easily removed with a light sanding. Next, put a tick mark on the inboard side of the bulwark. This will establish the after end of the scupper.

Now that you have the position of the last scupper you can mark off its width, using a pair of dividers, followed by a pencil mark. The space between the scuppers will be occupied by stanchions. These spaces are also marked off with the dividers along the edge of the deck line penciled in earlier. The top edge of the scupper can be drawn in with the compass using the same method as was used for drawing the inner edges of the margin planks. Small pilot holes are drilled at each end of the scuppers, then a slit is made between the holes, followed by a narrow wedge cut top and bottom along the slit.

These scuppers are very narrow and you may prefer to do the final cutting after the bulwark is installed on the hull, but before you do install the bulwark you should give the deck several coats of Val-Oil to seal it. Since the Val-Oil will make it difficult to permanently glue on the deck furniture, be sure that you keep the deck openings clear.

Apply the glue to the rabbet first. The bow area has considerable end grain and will soak up the glue more rapidly than the sides. You may have to apply more than one coat. If you find the glue setting up too quickly apply a little water with your finger, then wait until both the bulwark section and the rabbet are tacky. Don't rely only on the glue to hold these sections, use pins as you work forward from the break in the quarter deck. Bulldog clamps are used at the bows to hold the ends in position until dry. Wooden pads placed under the edge of the clamp will prevent marring the surface of the bulwark (Figure 50).

Allow at least 24 hours before removing the clamps and the wooden strips at the sides of the hull. Remove the excess wood at the bottom edge of the bulwark with a medium warding file and then sand smooth. The scuppers can be opened up now using a narrow strip of sandpaper inserted in the slot made earlier.

The next step is to mark the position of the timberheads on the inboard side of the bulwarks. Up in the bows, on the deck plan, you will find the location of the hawse pads. If this were a real ship the bulwarks would have been made up of individual planks. To prevent them from wearing where the anchor cable comes inboard, the area is padded out with extra wood (Figure 51).

On the model the inboard pad is cut from 1/32" sheet stock (Figure 52) with the grain running up and down in order to take the curve of the bow more easily. A better fit can be obtained by first cutting a paper pattern. The top timbers are cut from 7/64" square stock.

If you paint stock before cutting, do so on three sides only, leaving the fourth for the glue. If you like, you can also paint the inboard side of the bulwarks now. The position of each of the timberheads should be covered with narrow drafting tape before painting. The color used is Poly-S PR40 Dark Green. This same green is also used on the hull. If you leave some extra tape at the top of the bulwark, these narrow strips will be easier to remove.

The timberheads can be installed as soon as the paint has dried. Their lower ends are cut at an angle to fit the deck, and the top is cut flush with the top of the bulwark. While you are working in this area you will want to cut the two small

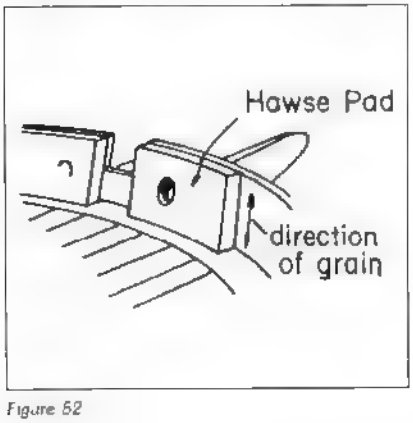


Figure 52

pads that support the heavy boom that runs athwartship, called the traveler boom or horse

These pads are cut from 1/16" stock, and they fit between two timberheads, but are not installed at this time. Before cutting them to fit, first bore pilot holes through their centers to avoid cracking them. Once the hole is enlarged to fit the boom, you can trim the edges to fit between the timber heads

PREPARING THE HULL FOR FINISHING

Both the main wale and rubbing strake above should now be marked out on the hull. Their location at each station should be transferred to the templates if you haven't already done so

These positions are marked in on the hull at every station. Use flexible drafting tape 1/16" wide to connect the marks in a fair curve. When you're satisfied with these curves add some extra tape to the main wale. You will have to seal the hull with Val-Oil and you don't want it running into this area

Any obvious dents should be filled with a sanding filler before giving a coat of sealer to the hull. The sealer will prevent any possibility of sap bleeding through the paint job in the event that you have constructed your hull block from pine, rather than basswood

The sealer also will provide a good smooth ground for the paint. The first coat of paint should be a thin one and after it has dried you should look at the model in a strong light for any additional imperfections that have a way of showing up after the paint has been applied. If more dents appear resand the surface and give the hull another thin coat. The final coat will be done after you have finished the transom assembly

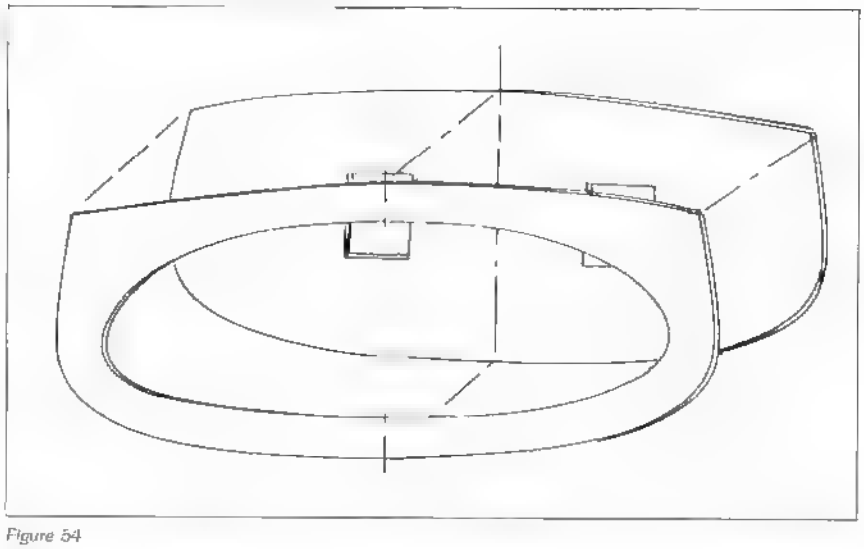


Figure 54

THE TRANSOM

The transom is built up in two sections from 1/32" thick sheet stock. The patterns are shown in Figure 53. These are cut with the grain running athwartship. Patterns should be made of both sections and then tried on your hull to be sure they fit. The top and bottom edges have a slight bevel. The top edge follows the angle between the transom and the deck. The lower edge follows the angle of the counter as viewed in the sheer plan. Center lines are drawn on the after face of the transom on the hull and the patterns. Also mark the center line on the after edge of the deck so that it will be a reference point for you when you install the transom assembly.

After you have cut out the patterns, take the lower one (Figure 54) and mark the window location on the transom. These get painted a pale blue to simulate the reflection of water. It livens up this area rather than painting the area black or some other dark shade. When you've done this, you can rubber cement the patterns to the stock and cut them out beginning with the oval opening in the top one and the windows in the lower one. This lessens the chance of splitting the wood. At the same time, fine pilot holes can be bored for the pins that will secure the transom assembly to the hull.

After the sections have been cut out, and before removing the patterns, transfer the centerline marks to the upper and lower edges of both pieces. Remove the paper patterns and take away any excess rubber cement with your finger. Finish up with a smooth sanding of the upper

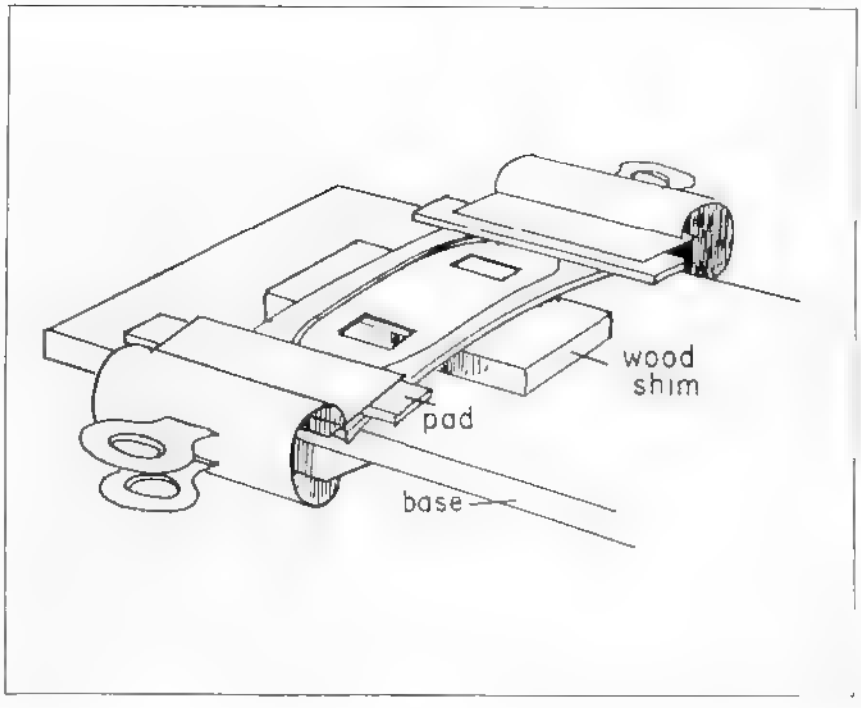


Figure 55

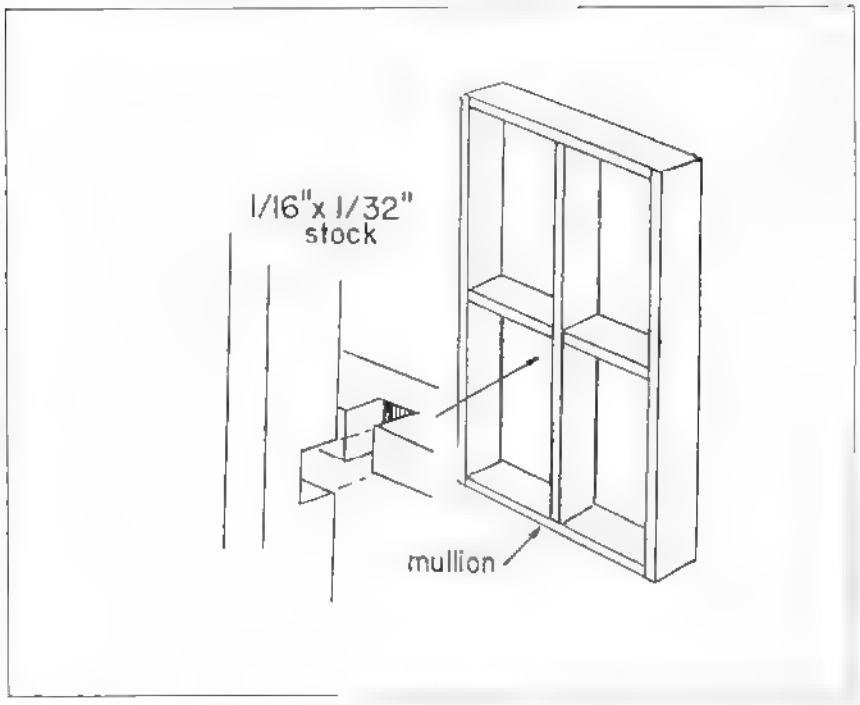


Figure 56

surfaces

Before proceeding you will have to set up a simple jig for bending in the curve of the transom (Figure 55). You'll need two bulldog clamps, two small scraps of wood, a small shim 1/8" thick, and finally a scrap of 1/4" ply as a base. The shim piece should be rounded on the edge that comes in contact with the transom so that you don't get a sharp bend. Both sections need to be well dampened and then glue is applied to both. You'll find this gets a little slippery to handle until the glue becomes slightly tacky. The two sections are joined at the center line on the edges, clamped on one side with the shim underneath, and then clamped on the other. Do any necessary shifting now before the glue sets up. If you find the wood drying too quickly, redampen it or, better yet, let it dry in a cool dry place. This will help to set the curve.

If you notice any curling of the edges you've applied too much water. Correct this by covering the piece with light weight cardboard and on top of this — next to the clamps — two more small flat pieces of wood. Secure these with rubber bands.

While this section is drying you can go on to constructing the windows. Use 1/32" thick stripwood and sand it before cutting it. The mullions interlock (Figure 56) at the center and the surrounding frame is butt joined. Paint these white and set aside for installation later.

Once the transom is dry it should be given a light sanding on the outer face. Then try it in position. File the bevel on the top and bottom edges and then give it a coat of paint, but leave the inner edge of the curve unpainted. Take a length of linen line 1/32" in diameter and fit it inside the curve. Remove it and give it a coat of Caboose Red.

While this dries, give the transom another coat of paint. Scrape away any paint that may have run into the window openings, then cut two small pieces of clear plastic wrap to just cover the blue painted sections on the hull. Use a little epoxy to secure the corners then install the window frames in the openings of the transom. Apply glue to the back of the transom and the hull and allow it to get tacky before joining the pieces. Make certain your center lines are aligned, then pin securely and let dry.

MAIN WALE AND RUBBING STRAKE INSTALLATION

The main wale is installed in two sections, one straight and the other curved. The curved section is cut from 3/32" sheet stock. The straight section from 3/16" x 3/32" stripwood. The two are butt joined but a more satisfactory joint at this scale is a wedge-shaped joint where one section overlaps the other.

The three outer faces should be pre-painted before installation on the hull so that only some touch up is required once it's on. The curved section should be pre-bent (by heat bending, before installing it. The straight section could also stand some bending along its length to make installation easier. Glue and pin the curved section first, followed by the straight section.

The rubbing strake is stripwood measuring 1/16" x 3/64". This strip must be heat bent to take the curve of the bow. Drill pilot holes down the length of this strip. Paint the strip on three sides with Caboose Red.

Before installing the strip you should put on the hawse pads and bore for the hawse holes. Take the shape of the pads and the location of the hawse holes from the plans. Begin with the small pilot holes bored in an upward direction. As it begins to break through inboard, check its location. Adjust it if necessary before you enlarge the hole with a round needle file.

The outboard pad is cut in the same manner as the inner one and it is advised that you use a pattern just as before. After gluing, paint the pads the same dark green as the hull.

After removing the tape, the rubbing strake is installed beginning at the bow. Before applying the glue try pinning it in position first and then cut off any excess from the after end. Once you have the proper length you can permanently glue it in position and do any touch up painting that is necessary.

A WORD ABOUT BRUSHES

Good brushes deliver a superior paint job and their additional cost over that of the usual "model" brush more than makes up for their cost. A broad flat brush whose bristles are about 5/8" across is good for large areas such as the hull, a number 2 or 3 round brush will work for the small areas. All of these should be of sable and are available in a number of grades at any good art supply store. If you're concerned about cost, pick something between student and master grade for the best results.

Don't allow paint to dry in the brush. Clean your brushes immediately after use, preferably with a coconut oil soap (available in super markets). Detergent soap will rob the bristles of their natural oils and should be avoided.

20

Ironwork

Although some people prefer to leave the installation of the rudder until after the rails have been put on, I find it a good idea to do it beforehand. The delicate railings which surround the quarter deck could otherwise be subjected to damage. This brings us to the first ironwork on the VICTORINE.

Whether or not you plan to have a working rudder, the general rules for soldering will apply. A working rudder is not a necessity, but for those who would like one, I will include the instructions for it as well as for the stationary one.

Brass sheet and flat stock will be used to fabricate the gudgeon and pintle straps and both can be soldered with either rosen core lead solder or what is called soft silver solder. The latter is preferable since it is stronger and is not subject to bloom.

Successful soldering depends on several factors. Perhaps most important of all is a clean surface at the joint. Depending on the type of joint you are working with, files or emery cloth might do, but for a final cleaning you might want to use muriatic acid, followed by a rinse in clear water.

A soldering block is a necessity, as well as a small soldering iron and a means of holding parts together. In some cases, such as building an anchor, banding wire should be used. Hardware stores can supply fine iron wire on spools, used for this purpose. To save time when work begins, it pays to take a few minutes to shave off some solder and to keep it in a small container until needed.

As you become more familiar with soldering techniques you'll be using some tricks of the trade such as pre-tinning parts prior to applying heat to the joint. Most of the soldering involved in the ironwork on the VICTORINE is pretty straight forward. Any special operations will be described in detail.

Packages of shim brass are available in most hobby stores, or mail order supply houses. These give you a range of weights to work with both on this project and those in the future. A small tin snip, (without serrated blades), is useful, although scissors can be used in a pinch. All the brass you will be using must first be softened (annealed) before soldering. The softening process makes both the soldering and the drilling much easier. You will be drilling many holes for fittings so you should take some time out to make a simple small punch from a large darning needle. Just cut off the eye portion and then file it flat so that your hammer will hit it squarely. A punch will insure an accurately placed hole and keep your drill bit from wandering. A good quality needle should be used and as such it can also be used as a scriber.

If you haven't already done so, get a small pin vise and some twist drill bits. These are cheaper by the dozen and since they tend to break easily, it pays to purchase them this way. The most frequently used bits are #72 and #78.

GUDGEON AND PINTLE STRAPS

The gudgeon and pintle straps are made up in pairs. The pintle portion goes on the rudder blade while the gudgeon secures the assembly to the hull. On the inboard end of the pintle is a short pin which engages into a hole at the after end of the gudgeon (Figure 57). For the mechanism to operate properly (whether moveable or not) a space is cleared on the fore edge of the rudder blade just under the pin. The space must be large enough so that both straps fit easily and so that the rudder can be unshipped by raising the blade and lifting the pin out of its hole.

Normally this space is about 3¼ times the width of the strap. The lower end of the space is curved in a short radius with a slight bevel on its outer edges. The gap between the blade and the sternpost should be as small as possible, otherwise the efficiency of the rudder would be lost. You'll note, from the plans, that each pair

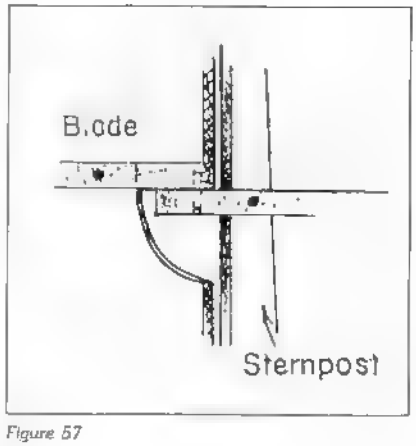


Figure 57

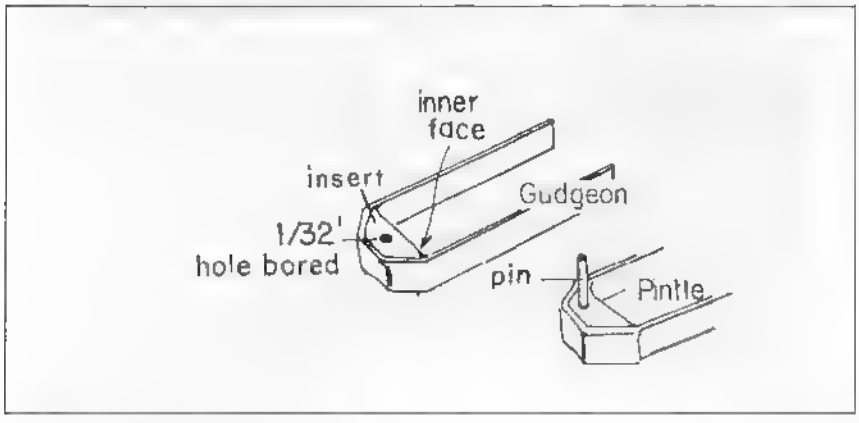


Figure 59

of straps are different in length Although the centerboard will not be installed until the last minute before mounting the model on pedesta.s, it's a good idea to make the strap for it at this time and to finish painting it in preparation to final installation

CUTTING THE STRAPS

The sheer plan indicates the width of all the straps and approximately half the length. It is a good policy to cut all the scrap material slightly longer than necessary. Earlier, I told about putting a bevel on the fore edge of the rudder blade and after edge of the sternpost so that the rudder could turn a full 45 degrees with ease. The gudgeon and pintle straps will have to follow this same bevel

I also suggested grooving the areas where the straps would be placed on the rudder blade. If you haven't done this yet, do it now. It will make placement of each strap unit much easier Se.ect some light weight shim brass for the straps and scribe some long lengths, using the longest

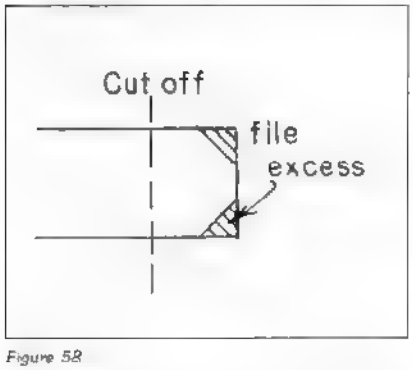


Figure 58

sides of the shim and cut these out

The brass will have a tendency to curl as you cut, but the strip can be straightened by clamping one end in a vise and pulling the other end out straight with a pair of pliers. The strip is heated to a dull red over a gas flame (your stove will do), then cleaned up with emery paper or cloth

Place the strip on the plans just below the lowest pintle strap and scratch in the location of the bolt holes on one side only Mark the center of the strap at each hole location and lightly punch; then drill the hole for the bolt In our case this will be a lil pin. A #72 drill should do. Clean up the burr on the opposite side with the emery cloth

Place the strap in position on the blade, hold securely and wrap it gently around the fore edge, and with the X-Acto blade, scribe the top edge of the strap on the blade, then remove the strap. This scribed line gives you the upper boundary for the space you must cut away. This is done for working and non-working rudders

On the blade mark in 3-1/4 widths of the straps on the fore edge The depth of the cut is slightly over the width of the strap. Do this cautiously, a little at a time You can cut more later if necessary. Wait until later to cut off the excess strap material on the opposite side. You should now have the shape of the forward edge clearly bent into the strap. If necessary, after you've taken it off the blade you can increase the marking by using a flat nosed pliers

The same operation is followed for shaping the strap for the gudgeon section, with the exception of cutting away any wood. The only added difference to the strap is the extra material needed to side under the pintle section. For this reason the actual length of the strap must wait until both are joined together. You'll begin with the working rudder which requires the most work

WORKING GUDGEON AND PINTLE

For this type of strap it's necessary to cut an insert that will fit the inner portion of the strap, large enough to accommodate a pin and hole. These inserts are made from brass strip stock the same thickness as the strap itself. The bevel shape of both the pintle and gudgeon must be scribed onto the strip. Begin by filing the end corners of the strip until you have a good fit (Figure 58). Don't leave too great a gap between the shaped strip and the strap. Once you have a good fit cut off slightly more than you will need because you can file off the excess after you have the pin and hole aligned (Figure 59)

Repeat the process for the second half of the unit, then scribe center lines on the tops of both. The inserts can be soldered into position now but be sure to preheat the insert and clean it before you apply the flux and scrap of solder. The heat from the iron should be applied to the insert since it has greater mass than the strap and therefore will absorb more of the heat You'll know when the joint has heated enough for the solder to run when you hear it sizzle. The solder will flow bright and then dull as the joint cools. Don't attempt to move the joint before this happens

Starting with the pintle portion of the unit, place it on the rudder blade to see how much of the back end of the insert needs to be filed away When the fore end is flush with the fore edge you'll know you have a good fit. Do the same with the gudgeon Setting the pin in the pintle comes next. Use a length of 1/32" rod for this and again cut it oversized for easier handling

The hole for the pin should come about 1/32" in on the insert portion

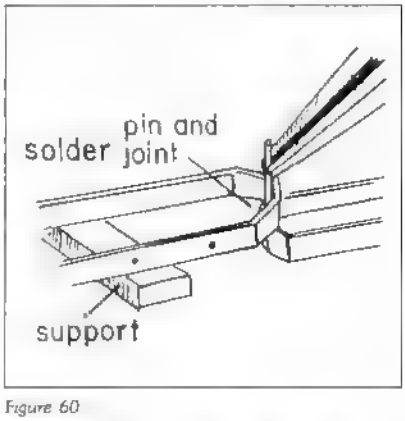


Figure 60

Use the punch to locate the position for the hole on the insert and repeat for the gudgeon section. Nip the end of the pin off so that more than 1/32" protrudes. The shorter pin will make unshipping easier. Replace the pintle in position on the rudder and hold in position while you mark the end of the strap on the opposite side Cut off and smooth over with a file

Repeat for the gudgeon section, then mark in the position for the bolts. Punching

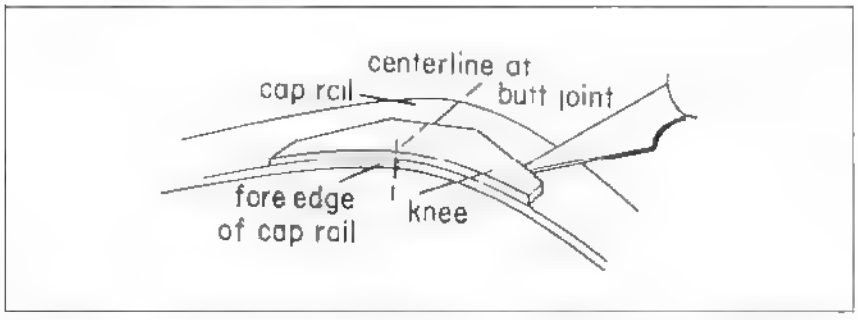


Figure 62

for these bolts and boring for their holes must be done on a scrap of wood that will fit between the two strap arms. Once this is done you can install the gudgeons and pintles.

INSTALLATION

Begin with the pintle. Place in position and apply a touch of Crazy Glue® to the back of the pin portion of the insert. Work the strap into its groove and bore through the existing hole nearest the fore end of the blade. Do this gently until you feel it coming through to the back section. Clear the drill several times before going all the way through. Once it is through, insert a lill pin and nip off both ends so that only a small portion remains. Using an anvil, tap it lightly with a hammer to burr over the ends. Then proceed to the next hole.

Place the gudgeon portion onto the pintle, and if this gives you trouble, it will mean that you must remove more wood on the rudder blade. It should come on and off easily. You might need to shave more off the curved portion of the space below the pintle.

After you're happy with the fit, place the gudgeon on the hull, engage the pintle and align the two units. Next mark the position of the gudgeon on the hull. The pintle can be released and you can begin to insert the lill pins on the gudgeon — again beginning closest to the sternpost. A fine nail set will help here. Because of the curve in the hull you will have to proceed cautiously. Once all units have been installed (Photo 4), the rudder blade can be removed and the ironwork painted black.

Touch up any areas that need it with the green paint and then remount the hull on the building strip, you can now begin work on completing the head of the rudder (as covered in Chapter 19).

STATIONARY RUDDER

This type of rudder assembly is far simpler to make and you may prefer to do it this way. No insert is necessary. The inner ends of the gudgeon and pintle straps are filled with solder. The pintle portion of the unit has the pin inserted against the inside of the straps (Figure 60). Pre-tinning all the parts helps to keep the solder where you want it. You will also have to support one of the straps with a thin piece of wood.

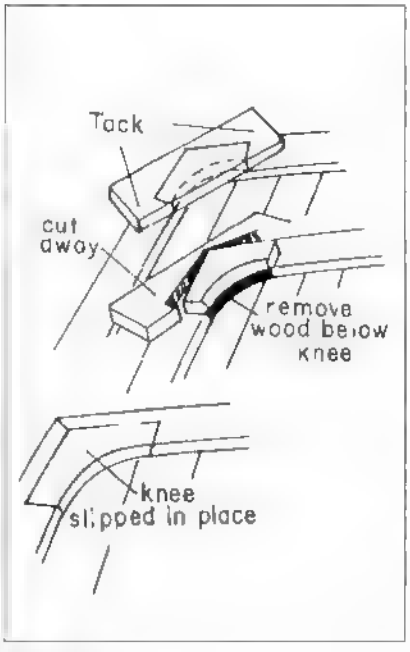


Figure 61

The straps can be taped into position while you apply the heat to the joint. After cleaning up both units, install the pintle strap to the rudder blade as before. The arms of each gudgeon strap have to be bent back in order to install the rudder blade on the hull and get it inserted into the rudder post. Once that's done they can be pressed back into the correct position and bored for the lill pins. Finishing is the same as for the previous method.

RAILS AND BULWARK STANCHIONS

The cap rail on the main deck is the first rail installed on the VICTORINE, followed by the rail on the quarterdeck. Both rails have a slight curve fore and aft which will require a tracing to get the shape right. In both cases the straight portions can be shaped using a flat iron to set the slight curve, but the curve at the bow and across the transom must be cut from sheetstock 1/32" thick. The tracings made earlier when you laid the decks will help now to establish these curves, but the bow section of the cap rail will need modification.

You'll note that the bow section on the plans widens as it approaches the centerline at the bow. On top of this rail at that position are two short splash rails called buffalo rails, probably due to their shape. These rails taper at their after ends, terminating at a timberhead.

Before the cap rail can be installed, the opening for the bowsprit has to be cut to the correct width and depth so that the spar will fit easily under the rail which is joined at the centerline over the bowsprit. You can establish this height and width by using a scrap of stripwood cut to the

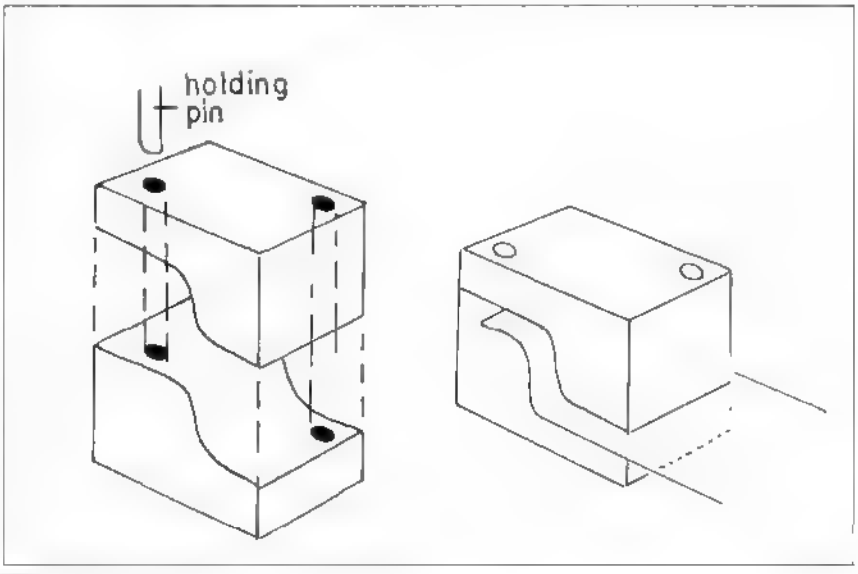


Figure 63

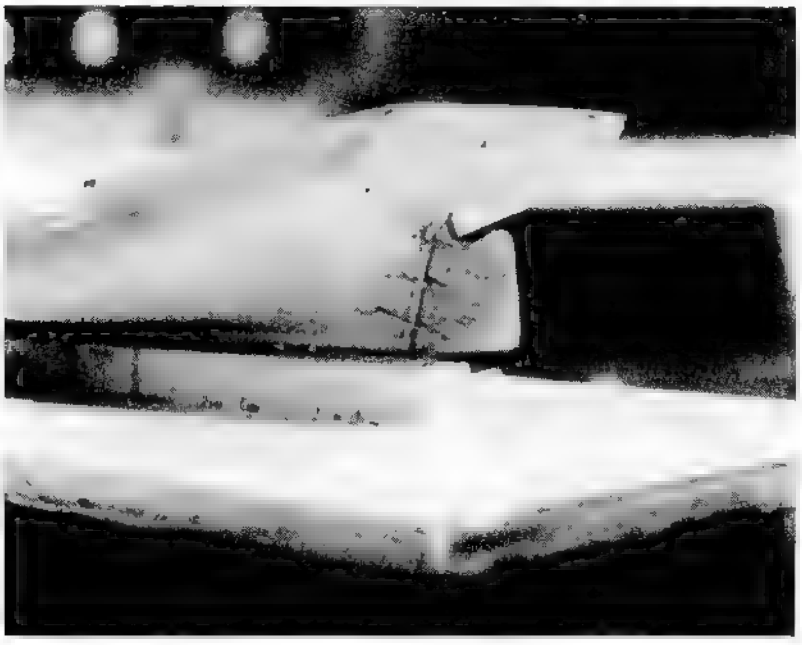


Photo 4

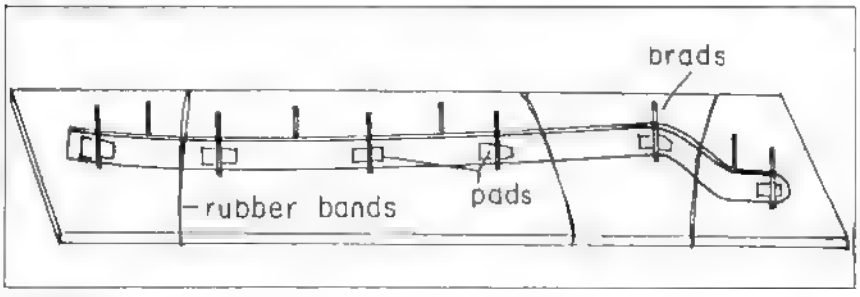


Figure 64

dimensions of the bowsprit where it enters the hull. Once the opening is correct you can proceed to the rail

The straight portion of the rail is shaped first. Use a moderately hot iron and gently push the strip into a curve as you pass the iron over it. Check your curve on the plans. A little extra length will help and keep in mind that this rail extends all the way back to the transom. At the fore end the rail scarfs to the curved portion while the after end is mitered to the section which runs across the transom. Small knees are used to join both sides of the rail at the bow and at the transom, however these are installed later. You should cut the scarfed portion first

After you have traced the shape of the rail from the plans, rubber cement the tracings for both the port and starboard rails to the sheet stock and then cut them out and sand them. The inner and outer edges should be slightly curved, and if you plan to stain the wood you should do so before the rails are installed. Cut the scarf on the curved portion and then overlap it onto the straight section as you did for the margin plank earlier. Next, cut and fit the section that runs across the transom and then glue this into position and miter the corners. Keep in mind that the rail at the side overhangs the deck portion by 1/32"

Fit the bow section next and mark the location of the scarf at the side. Bore pilot holes at about 1 1/4" intervals at the location of timberheads so that lit. pins can be driven in to secure the rail. Temporarily pin the front section while you fit the proper length for the straight section at the side. Cut the miter on the after end a bit at a time until you are sure of a good fit, then glue and pin the straight section followed by the bow and repeat for the opposite side

The knees are fitted next. At the transom tack short lengths of stripwood 1/4" wide and 1/32" thick on the corners. Draw in the shape of the knees (Figure 61). Cut the knee out and scribe the shape of the knee on the margin plank below; then remove the wood. Remove the excess wood and drop the knee into position with a drop of glue on the underside

At the bow, rubber cement a scrap of tracing paper to the joint of the port and starboard rails and draw in the shape of the knee. Remove the tracing and re-cement it to a scrap of sheet stock and cut out. Next, place the cutout knee onto the rail with the centerline lined up with the joint and scribe in the shape of the knee onto the rail section (Figure 62). This area is very delicate so you should gently carve away the excess wood a bit at a time until you can press the knee into position. Glue should be applied to the knee and the opening and allowed to get tacky before the knee is installed

The buffalo rails are cut from 1/16" thick stripwood. you can heat-bend the stock (prior to cutting out the profile of the rail) over the soldering iron. Cut each to equal lengths, then taper them to the shape shown on the plans. The fore end of these rails are curved. Use a round needle file to get this shape. Both the rails and the timberhead are painted green prior to gluing and pinning them to the cap rail

QUARTERDECK AND TRANSOM RAILS

As mentioned earlier, both the transom and side quarterdeck rails have curves which require tracings. The tracings made for the transom margin plank can be used now but you should leave a little extra space at the ends to allow for the overhang and miter cut where it joins the side rail. Davits will be installed over the tops of these joints so you can leave the joint without a knee

At the fore end of the straight section, the rail has a slight "S" shape where it drops to fasten to the cap rail on the main deck. The rail is supported by stanchions 3/64" square down the sides and across the transom. These stanchions are painted green as is the rail. The stripwood used for the stanchions should be painted ahead of time so that only touch-up will be required when they are installed. The stripwood used for the rail section should be cut a little longer than required so that the curve at the straight portion can be set more easily after the "S" curve has been set

There are two ways to do this. One is to make a male/female mold (Figure 63) to set the curve or by making a jig from

a scrap of 1/4" plywood using brads padded with cardboard (Figure 64). The jig requires a tracing of the shape as shown in the profile view on the plans for the whole length of the rail

The mold just requires the "S" shape The tracing for the mold is rubber cemented to the side of a block of pine and cut out on the band or jig saw Holes for locating pins should be bored for at the corners at the top of the block prior to cutting the "S" shape. The jig tracing is rubber cemented to the plywood and then fine brads 3/4" long are driven into the outside of the line to allow for the cardboard pads. Setting this curve will have to be done in stages, beginning with the first part of the curve. This means boiling the plank in some liquid fabric softener for a few minutes. The brads around the curve must be set at rather close intervals for a smooth bend Once the first curve is set you can begin to put brads in for the second (reverse) curve Take this slowly or you will snap the strip.

Complete the remainder of the rail and allow to set overnight before removing it Once both rails are set, the side curve is shaped over the soldering iron

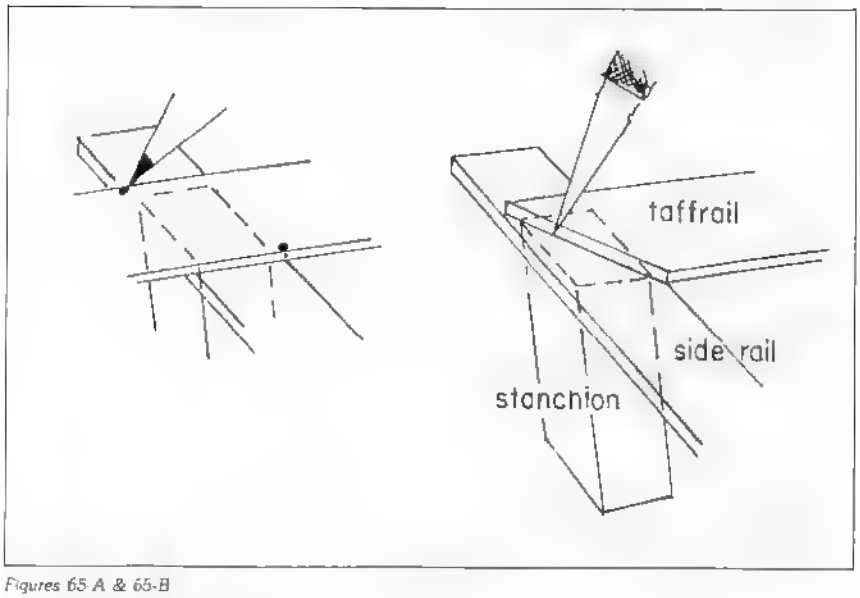
CUTTING THE STANCHIONS

The height of the stanchions can be taken from the sheer plan. The aftermost one at the transom is thicker, fore and aft, than the others, since it must carry the rail at the side and across the transom. Fit the stanchions at the transom first. They should rest against the back of the transom. The stanchions should be pinned and glued to the deck. Keep in mind that the athwartship curve of the deck will affect the angle at the lower end of the stanchions The end stanchions at the corners are cut from 1/8" x 3/32" stripwood. Next, mark in the location of the side stanchions at the sides and then cut, pin, and glue them into position

INSTALLING THE RAILS

The rail across the transom (taffrail) is used to establish the mitred corners for it, and the straight section. After cutting out the taffrail heat bend it to conform with the crown of the deck. Next, sand the whole rail and round the edges Mark the position of the stanchions, then bore for pilot holes at the center of each stanchion

Temporarily set the taffrail aside. Position the side rails over the stanchions beginning at the fore end and mark the centers of each of the stanchions, then bore for pilot holes. Pin the straight portion of the rails into position on both sides of the hull with the excess overhanging the last stanchion. Next, pin the taffrail onto its stanchions and let the excess overlap the straight sections as in Figure 65-A Mark the points where the two rails cross With an X-Acto knife, cut a diagonal between the two points where the rails cross at the inner and outer corners.



Figures 65-A & 65-B

Remove the taffrail and rescribe the diagonal on the lower rail section, remove and cut through. The rails can then be permanently installed. This rail can be painted green after the boat davits are installed

BOAT DAVITS

The sheer and deck plans give the shape of the boat davits that are positioned on the quarterdeck rail. These can be cut from stripwood, but before shaping them the ends should be bored for the dummy sheaves. The length of the sheaves is marked on the ends, then bored out Figure 66). The excess wood between the holes is removed for a depth of about 1/32". This will be enough to give the illusion of real sheaves once the boat falls have been installed

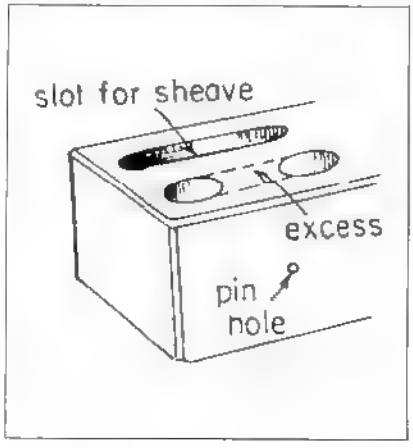


Figure 66

21

Deck Furniture

Most of the deck furniture for the VICTORINE is simple to build from a combination of sheet stock and stripwood The amount of detail on these simple structures is kept to a minimum with the exception of the windlass assembly Making it involves a combination of wood and metal parts, if the modeler wants it working. All the parts, however, can be made of wood and simply glued together and then painted

Beginning at the quarter deck, there are a pair of bolsters, a ladderway cabin and an iron horse at the stern for the sheet block The position of all of these and the remaining furniture is shown on the deck plan. This plan will give you the width and length of each item while the profile will give all the heights of the various members

The iron horse can be made and fitted at this time however, permanent installation should wait until you are ready for the rigging. These horses look especially good if they are fitted with flanges at the deck level. At one time it was possible to obtain small eyelets that were used in an R/C

Photo 5 *Photo by George Ancona*

airplane whose inside diameter just fit 1/32" brass wire

The bolsters (Figure 67) are made from stripwood. As you can see, the crosspiece is let into the upright and its fore edge is rounded over. The uprights should be pinned and glued into position once the cross piece is installed. Prepainting these before installation is a good idea

The small cabin is made from two blocks of wood and covered over with stripwood for the paneling. The opening at the top (Figure 68) has a raised ledge that surrounds three sides and serves to support the opened curved doors. The underside of the cabin has a slight curve to fit the deck. Sheet stock is used for the cabin roof and the curved doors. The underside of the cabin has a slight curve to fit the deck. Sheet stock is used for the cabin roof and the curved doors. Begin by cutting the main block of the cabin slightly less than the area shown on the plans. The applied paneling will have to be figured into your dimensions since it will add to the width and length of the piece

A centerline should be drawn on the finished block as a guide for the paneling strips and the edges of the open portion Mark the roof curve on the ends and side of your block, and the location of the open hatch. Then file in the curved portion shown as a hatched area in Figure 68-A.

A pattern for the roof can be made from tracing paper after you have shaped the roof. It should include the open portion at the top since this area will be cut away from the roofing material. The smaller block cut from 1/8" thick stripwood should be cut to size and its upper surface rounded prior to gluing to the main section. It, too, should have a center line drawn in as a guide for the curved doors. These can be cut with a slight overhang and set aside until later. Both the strip stock and the roof material should be finished sanded before they're permanently glued into position

Proceed with the paneling on the sides of the block up to the doors. For these, use stripwood one half the thickness of the panel material to obtain a recessed effect The curved portion of the doors are filed flush with the top of the roof opening. Two small pins can be used for door knobs, but the heads should be filed down to about 1/32" in diameter

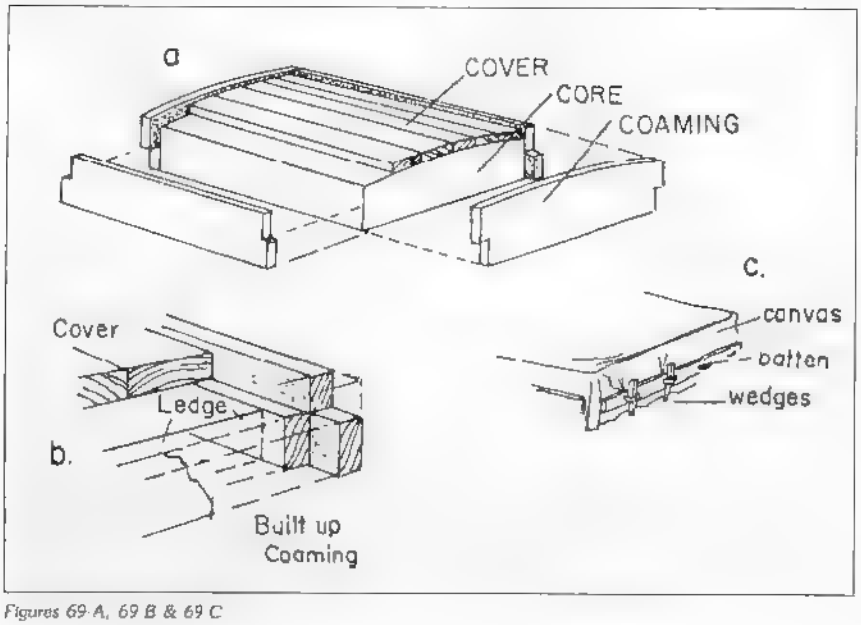
Next, install the main roof, then the top roof. The underside of the surrounding support will need to be beveled to fit the curve of the roof, then it can be glued in position Snip off some short lengths of fine wire to act as hinges, and glue these in place The whole assembly can be painted or stained and set aside for final installation later

HATCHES AND CENTERBOARD TRUNK

All the hatches and the centerboard trunk are constructed, using a solid block as a base, or core If the modeler prefers to have several of the hatches open, the hatch coamings can be built without the core The portion of the deck normally covered can be carved away and then stained a dark brown for a feeling of depth if greater realism is desired

Figure 69-A shows the general construction of the hatch with its cover You'll note that only the top is curved. The round up of the deck is put on the underside of the hatch after it has been completely assembled

Figure 69-B shows the built-up hatch coaming A ledge is installed on the inboard sides of the hatch for the cover to rest on. In foul weather these hatches had canvas covers fitted over them and secured by battens and staples in the sides, as in Figure 69-C. Small wedges were inserted to secure the battens. This detail can be



Figures 69-A, 69 B & 69 C

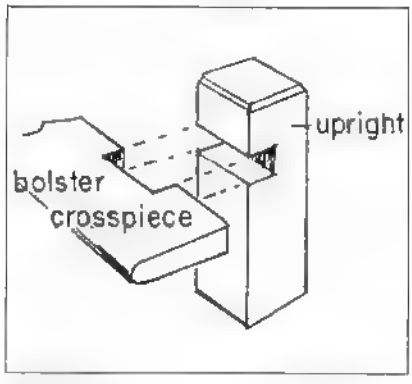


Figure 67

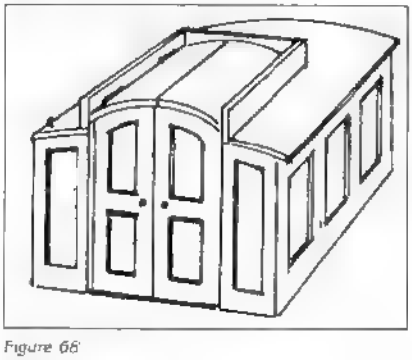


Figure 68

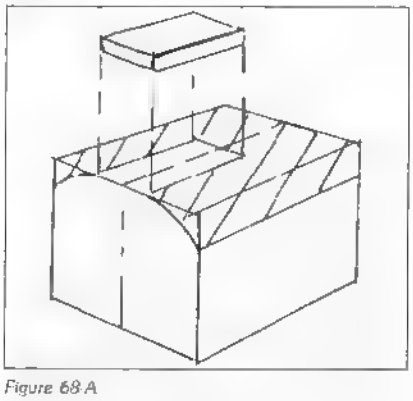


Figure 68-A

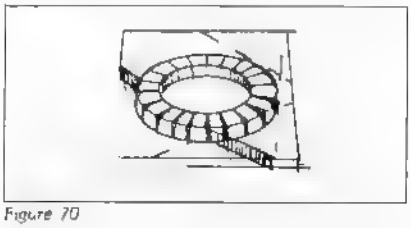


Figure 70

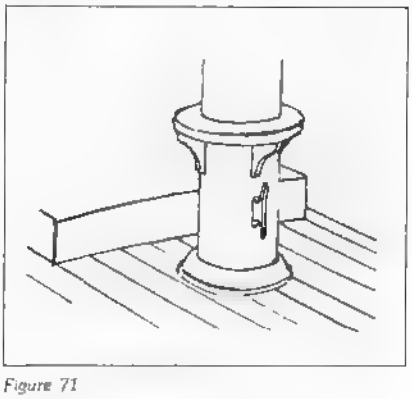


Figure 71

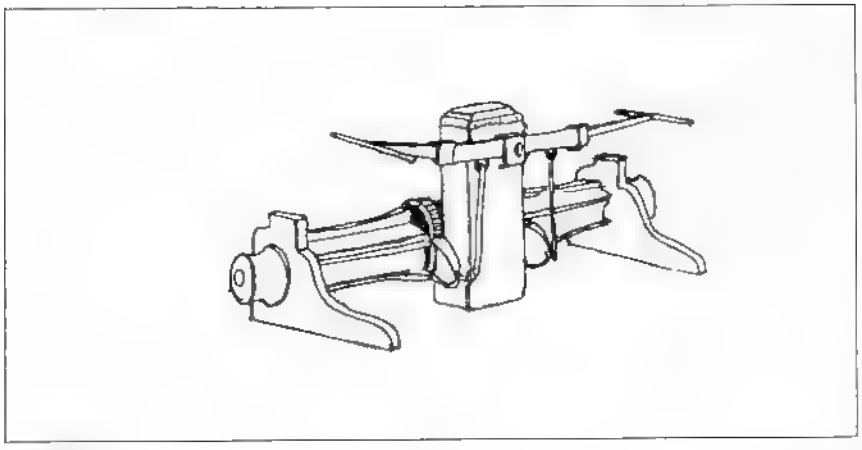


Figure 72

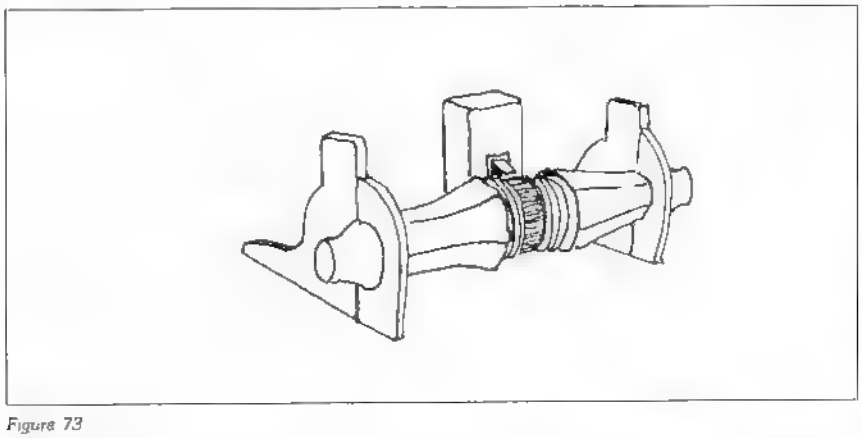
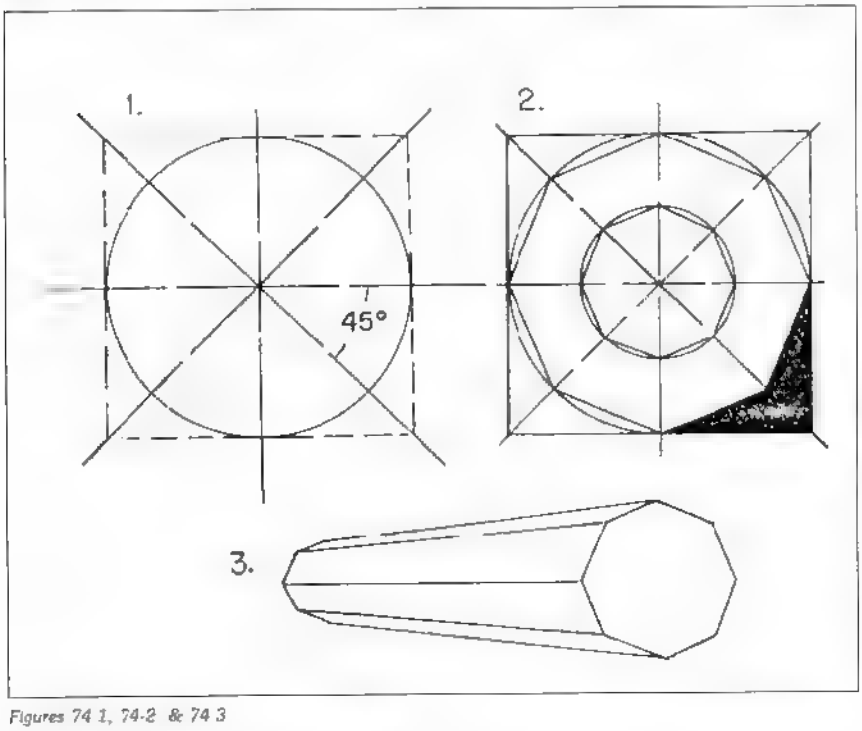


Figure 73



Figures 74-1, 74-2 & 74-3

added, but is not necessary. Small ringbolts, painted black, complete the hatches

The centerboard trunk can be made with a block cut to fit the opening in the deck. The two blocks have covers cut from thin stripwood with allowance for a slight overhang. The crank for the centerboard is simply bent wire, painted black

BOOM JAW REST AND MAST RING

There are two ways to make the mast ring and boom jaw rest for VICTORINE If you choose to make them from sheet stock (Figure 70), you begin with boring a hole close to the diameter of the mast

A pencil compass was used to mark the inside and outside diameter on the sheet stock prior to boring and cutting Once the hole has been bored, the outer edge of the ring is cut away in stages and then filed round. The wedges can be scored around the perimeter of the ring gradually, and not too deeply to avoid splitting the wood

The other method would be to use a wooden spool whose inside diameter is close to the diameter of the mast. The opening can be enlarged by using a round rasp in both methods. The rings can then be sliced off the spool at the required thickness, then sanded on a flat surface The boom jaw rest has four supports as shown on the plans (Figure 71). In full size practice, the masts ring is a canvas covering over wedges used to align the mast in its opening. It was nailed to the mast and the deck and then painted. This prevented water from the deck getting below and damaging cargo as well as preventing rot

WINDLASS AND SAMSON POST

The samson post serves as a housing for the bowsprit and as the location for the mechanisms which operate the windlass barrel. On the fore side of the post, at the top, are the rocker arms which are operated by heavers. They're fastened in the center by a pin running through a staple which, in turn, is fastened to the post.

Equally spaced from the center of the rocker arm are two long links suspended from eyes in the arms. At the lower end are the brake shoes connected by a ring to the long link (Figure 72). At the outer ends of the arms are sockets for the heaver bars On the after side of the post is the pawl which engages into the ratchet ring on the windlass barrel (Figure 73)

The barrel is supported by two stout knees that rest on thin pads on the deck These are made in two pieces from sheet stock The barrel is made from 1/4" square stripwood. The length of the barrel is taken from the deck plan and the stock is cut to this length.

The barrel is eight sided and this should be marked on the outer ends of your stock. In Figure 74-1 the dashed line represents the stock. The circle represents the greatest diameter of the barrel. In Figure 74-2 a second circle is drawn representing the diameter of the barrel at the warping head or outer end. Straight lines were drawn between the intersecting lines at the circles. These represent the bevels at these points. Material is first removed from the outer circle (3) — shown in black at (2)

Scores are filed into the stock for the knees and the central portion which wi

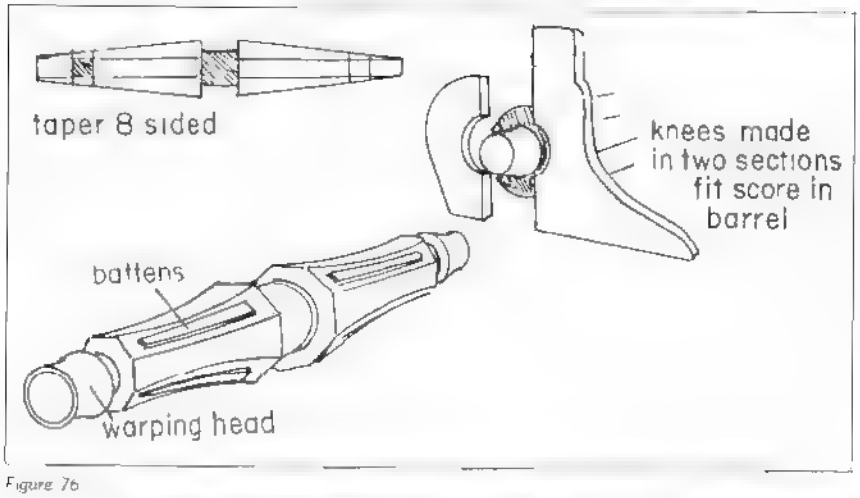


Figure 76

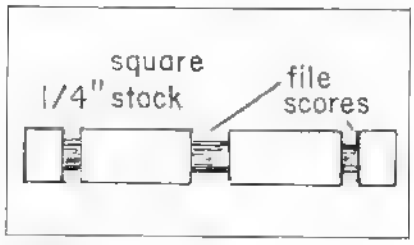


Figure 75

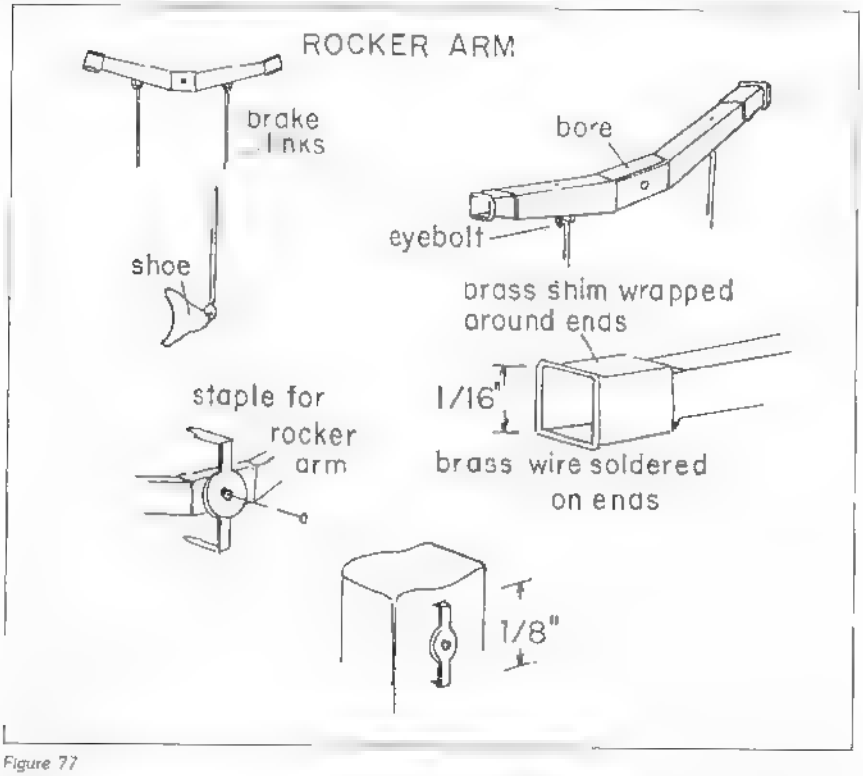


Figure 77

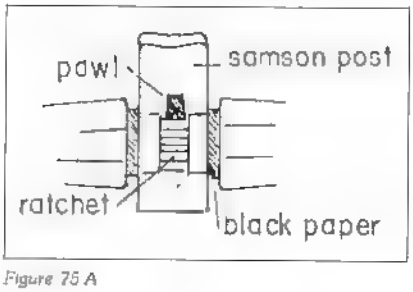


Figure 75 A

house the ratchet (Figure 75). This area can be filed in steps as in 75-A, or you can replace the central port on with a wheel from a butane lighter. When painted black, it looks quite realistic. The final taper is then put on the barrel and the ends (warping heads) filed slightly concave with a round file. Thin battens are glued to the flat surfaces called whelps on the barrel arms (Figure 76). Glue and pin these in place, then make the knees. They can be cut from one piece and sliced, then fitted around the groove in the barrel ends.

When I built the rocker arm assembly for my model of the VICTORINE I constructed it entirely of metal, both because I enjoy working in metal and to show the students I had at the time that it was not as difficult to do as they had imagined. As said earlier, it can be made

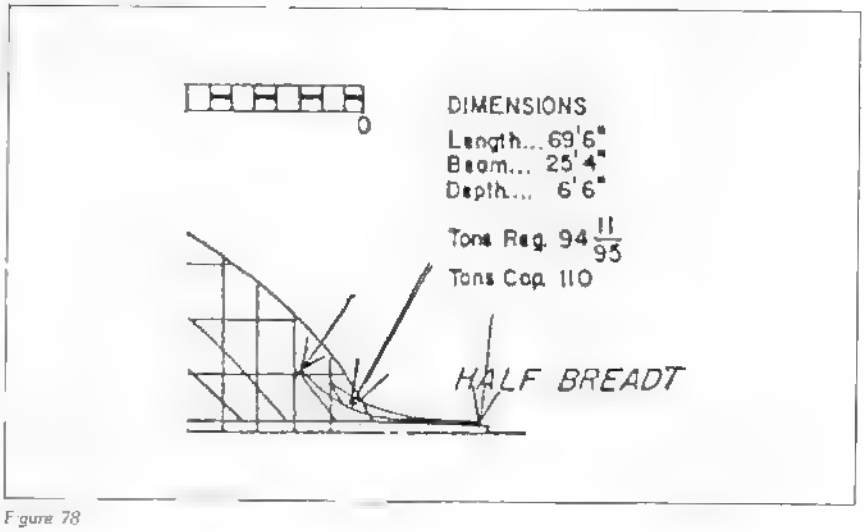


Figure 78

of wood and painted to resemble black iron, but you may want to try using the metal as well. The components are shown in Figure 77

It's important to have the windlass barrel complete before you begin work on the rocker arm assembly because the height of the ratchet will affect the length of the long links and brake shoes

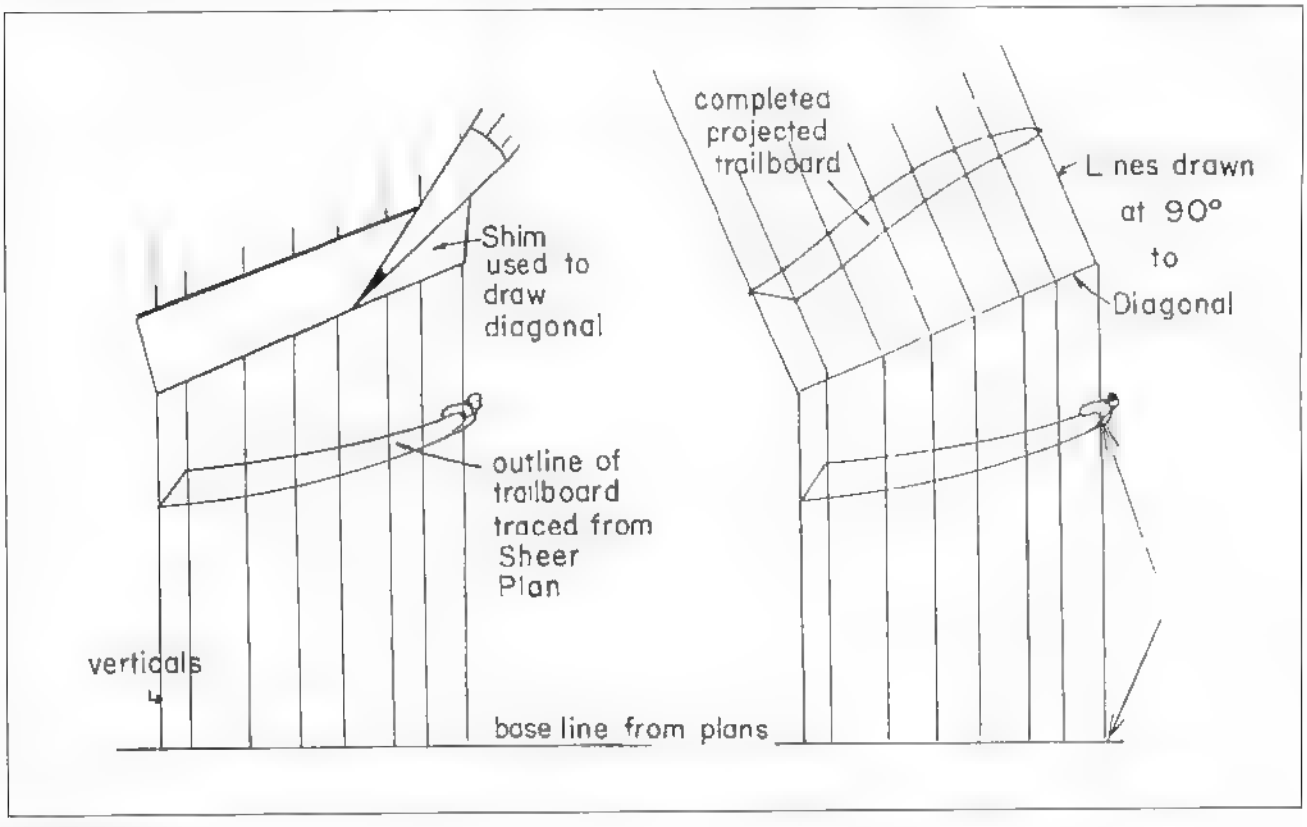
Remember that the pads under the knees will raise the height of the barrel so it's a good idea to glue them on at this time. If you haven't cut the samson post yet, you should do so now and make arrangements to pin it to the deck Its top should have the edges camfered and later, if you like, you can cover the top with a sheet of lead The wedge shaped pawl on the fore side of the post should rest on the center of the ratchet. This can be cut from wood and glued on or made from metal and pinned

The rocker arms were cut from 1/32" thick sheet brass and shaped as seen in Figure 77. The outer ends were wrapped with shim brass and soldered in position using Tix Silver Solder. I pre-tinned the outer edge of what now formed the socket so that a thin wire edge could be quickly soldered on before the first joint loosened The center was bored for the holding pin and then bored down through the top of the arms for the eyebolt that would hold the long links. To locate the position of these eyebolts, the rocker arm must be pinned to the post. The long links which fasten to these eyebolts are in line with the first scored edge of the ratchet section of the barrel. If you are in doubt about this, look again at Figure 72. The eyebolts are formed from thin brass wire

Use a needle nose pliers to form the eye and then thread the bolt up from the bottom. When it comes through, give it a slight bend, nip off the excess and tap it flat Position the eye so that it is in line with the arms of the rocket and touch with solder When secure, you can file the top edge flush

The shoe portion is cut from 1/32" sheet brass softened by holding it over a gas flame on the stove This enables you to bore into the back end of it for another eyebolt that will need to be soldered into position Clamp the shoe in a vise and use a needle as a punch to start your hole. If you miss this step you will find your drill bit running off the metal and breaking before you've made your hole

The hole can be bored with a #72 dri


completed projected trailboard
Lines drawn at 90° to Diagonal
Shim used to draw diagonal
outline of trailboard traced from Sheer Plan
verticals
base line from plans

Figures 79 A & 79-B

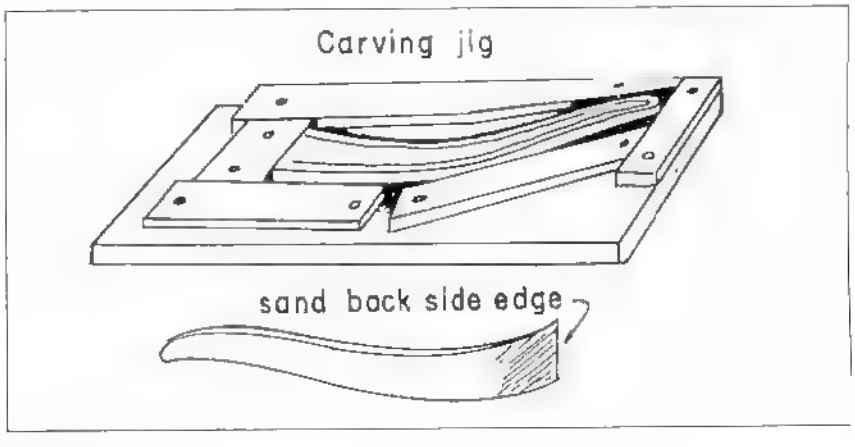


Figure 80

bit — in far enough to allow the eyebolt tail to hold well when soldered. The shoes are generally triangular in shape with sides about 3/16" long. The front edge is curved to fit the shape of the the ring on the barrel. The staple for the rocker arm is bored and filed to shape with two long arms that can be bent over and inserted into the back of the post. Use a bit pin to secure it when you install it. The tip of an X-Acto knife can be used to start the holes for the staple, then you can tap it home. But leave room so that the rocker will operate.

The long links are the final parts to make and adjust. You may be doing these several times over — I can tell you I did. They are tricky. Use some scrap wire to get the correct length. First set up the eye at the shoe, then thread the wire through the eye at the rocker. Pull on this until you feel you have the correct length. The shoe should hold against the barrel, without slipping. There's no easy way to do it but by trial and error. Once completed, the whole assembly can be painted. The heavers and the wooden portion of the barrel are stained dark brown, the rocker arm assembly, pawl, ratchet, and warping heads are painted black, and the samson post and knees are painted the same green as the hull. The completed windlass is seen in Photo 7. Also seen are the trailboards and a portion of the figurehead.

PROJECTING THE TRAILBOARDS AND THEIR CARVING

The shape of the trailboards as shown on the profile plan of the VICTORINE does not give its true shape. Most beginning modelers faced with this problem go at it trial and error until they arrive at something that looks as it should. There is an easier way and the following procedure will show you how it is done.

First prepare a flexible batten made from 1/4" wide thin brass strip (available from hobby shops). Cut a 6 inch length and lightly sand both sides. This will give you a surface that will hold a pencil mark. Brass is used rather than card stock because it will hold its shape after bending and it can be bent back to its flat state and re used.

1. To establish the true length of the trailboard bend the flexible batten to fit the lower curve of the trailboard shown on the half breadth plan and mark the ends of the curve indicated by the arrows. Flatten the batten (Figure 78).

2. Place a piece of tracing paper over the trailboard shown on the profile plan. Trace off the base line and outline of the trailboard from the plan.

3. Draw in a series of vertical lines at 90° to the base line. Next draw in a line crossing the verticles at an angle equal to the length between marks on your flexible batten (Figure 79-A).

4. Continue the vertical lines from the diagonal line just drawn, but draw them at 90° to the diagonal line (Figure 79-B). With two point dividers, measure the distance between the base line and the lower edge of the trailboard (indicated by arrows on Figure 79-B) and transfer this measurement to the corresponding vertical above the diagonal, then mark the spot in pencil. Do this for each vertical, then connect the dots in a fair curve.

You now have the correct shape of the trailboard and can transfer it to the wood you've choosen to make it with. Make a second tracing for the opposite side. The design can be painted on or carved, the choice is up to you. On my model I carved the trailboards from boxwood. Once the outline is transferred to the wood stock and cut out, the piece is put into a carving jig (Figure 80). Thin scraps of wood tacked to a base hold the trailboards in position during the carving process.

Begin with the border trim. This is scribed onto the wood with an X-Acto blade, followed by a series of wedge cuts with the blade held at an angle. When the border is sufficiently prominent, scrape its edges to round it.

Now sketch in the design of scroll work. Begin cutting it in the same manner; first the scribe cut followed by the wedge cut. The excess material between the curve and border can be removed with a small burr in a Dremel motor tool if you prefer, or just cut away. Once you have the scrolls in relief you can begin to shape them into pleasing shapes with the use of small chisels. Large darning needles with the eyes broken off, then sharpened on an oil stone, make good small chisels. They can be inserted into a small scrap of wood that will act as a handle to give you better leverage. Very little sanding should be necessary on the upper surface but you will have to sand the back of the work to reduce it to about 1/32" thick. In addition you will also have to sand the after ends so that they will lay flat against the side of the hull.

First, however, the piece will have to be steamed to take the curve as shown on the half breadth plan. Use gloves to protect your fingers because you will have to twist the small piece right over the spout of a boiling tea kettle. The boxwood is yellow enough and all that needed to be done with the finished carving was to fill in the green background color.

FIGUREHEAD

The figurehead for the VICTORINE is the bust of a woman (Figure 81). Its overall length is just under 3/8". For a carving this small use a tight grained wood, and if possible use a small branch, carving just the tip. This gives you something to hold onto while you work.

Mine was carved from a local wood called Firethorn or Pyracantha. Do the carving in a bright light to illuminate areas that need accentuation, as well as those that need to be softened. The figurehead is fastened to the stem by means of a slot cut at the back of the carving.

When finished, lightly sand and seal the carving, then remove it from the stick, cut the slot and paint. On my figurehead I used a violet cape with white accents on the collar, black hair and flesh tones for the skin. The figurehead can be glued to the stem and pinned, as can the trailboards.

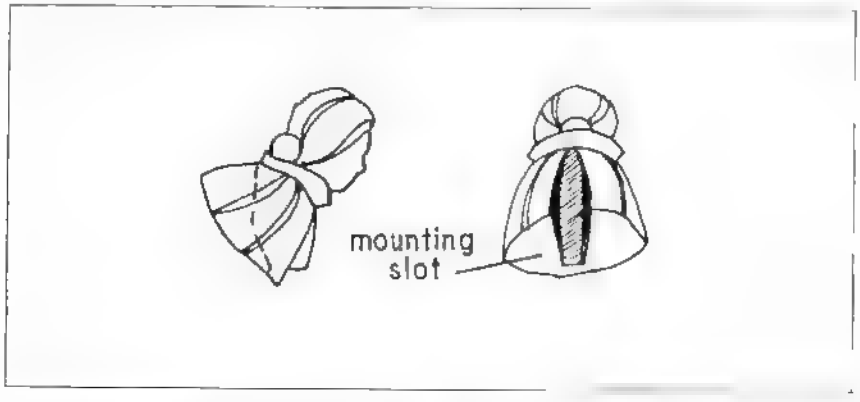


Figure 81

22

Fitting Out The Spars

The samson post is the first of the spars to be made and fitted out with all its gear and it will introduce the ironwork associated with spar work.

The shape and length of the bowsprit can be taken from the sheer and deck plan and the location of the sheave and short iron horse at the end of the spar can be taken from the sail plan.

Cut a 5/16" square piece of stock to the proper length and be sure to include that portion at the inner end which is cut at an angle at the samson post. The spar is square in section, inboard and also for a short distance outboard. This area needs to be marked on the stock after you have drawn a center line down its length.

Holes for the sheave and iron horse should be bored before the spar is shaped. You want to do this because it is next to impossible to bore these holes along the center after the spar has been rounded without the drill bit running off the mark.

The hole for the sheave can be handled in the same way as the boat davits at the stern. Transfer the locations of the sheave and the horse on the center line and bore through with a #72 drill bit. The main stay leads down through the sheave and sets up at a bullseye under the bowsprit to form a part of the upper bobstay. The iron horse is bolted to the bowsprit on the underside. A short club boom rides on this horse and to it is fastened the jib sail.

Setting up all this rigging for the bowsprit should be done prior to installation. Do as much rigging as possible and it will give you a variety of metalwork to practice your skills on. (Figures 82-A & 82-B)

The bowsprit can be shaped while it is held at the square end in a vise. The rough shaping is done with a file followed by sanding to remove the edges and file marks. At the fore end of the spar is a two lugged band for the topmast stay and lower bobstay. Its location is marked on the end of the spar and this area is reduced in diameter by about 1/32". This will form a seat for the band. The whole spar has a slight curve downward and it is created by wetting down the stick and putting it into a jig similar to the one used for the rail at the quarterdeck. It should be left overnight to set, then sanded to remove the raised grain.

Give the spar a coat of Val-Oil to protect it from fingermarks. The ironwork at the tip should be done prior to finishing.

Photo 6 — Photo by George Arizona

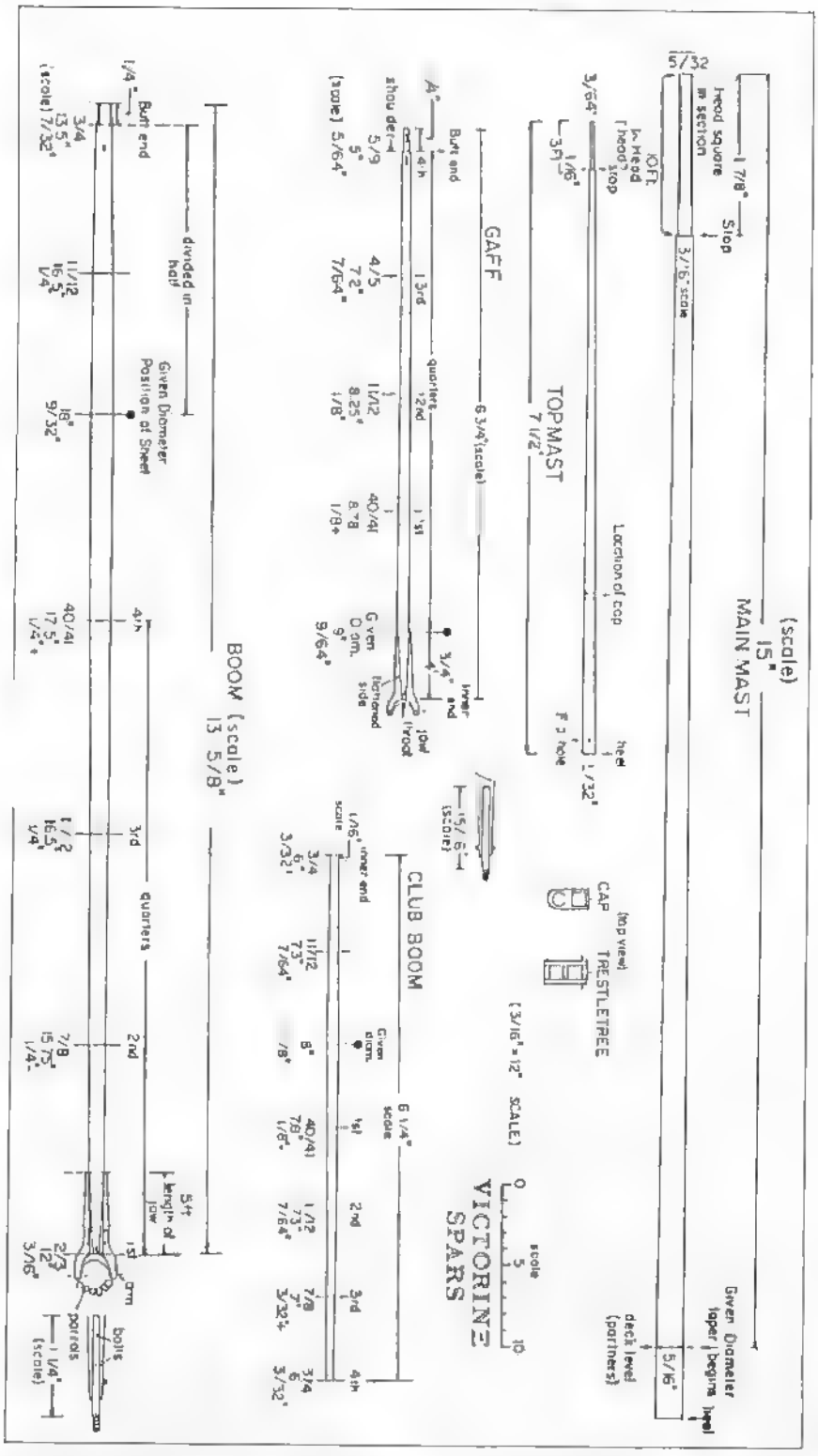


Plate Four

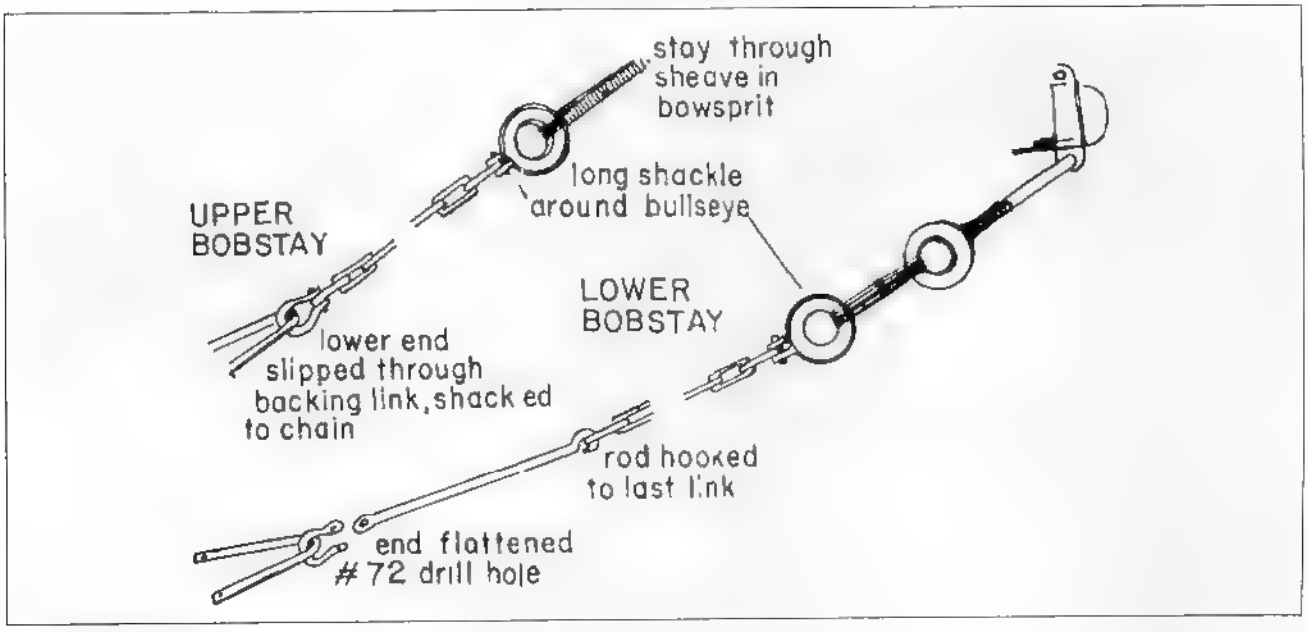
since there will be soldering done on the band while it is on the spar and this will burn it some. Test the fit of the bowsprit against the samson post and make any necessary adjustments with a flat needle file before inserting a pin at its inner end. Refit and bore for a hole in the samson post at the pin point location then complete the windlass assembly begun in the last chapter

MAKING THE BAND

Cut a strip of shim brass the width indicated on the sail plan for the eyeband at the end of the bowsprit. Bend the strip in two and bore for a hole at its end (Figure 83). A lug is formed by bending the strip back at right angles, then this portion is soldered together The hole that was bored will fill up with solder and will need to be rebored The lug is then wrapped with fine iron wire to keep it together while the second lug is formed and soldered

The brass strips are pinched around the end of the spar with needle nose pliers and wrapped with the fine iron wire and soldered into position The fit should be very tight, but removeable. The hole can be bored after the solder is cooled. This should be done off the spar.

In both cases, it is best to use a center


stay through sheave in bowsprit
long shackle around bullseye
UPPER BOBSTAY
LOWER BOBSTAY
lower end slipped through backing link, shacked to chain
rod hooked to last link
end flattened
#72 drill hole

Figures 82-A & 82 B

punch to locate the position of the hole prior to boring. This keeps the drill bit from running up on you. The lugs (eyes) are shaped as shown in Figure 82, with a needle file. An easier, but less polished method is also shown in Figure 82. This method uses two eyebolts inserted into a band.

The iron horse is made from brass wire bent to shape. An eyeband with one lug is fitted to both ends of the club boom (see sail plan Chapter 16) and the foreward eyeband's lug must ride on the iron horse. This fitting should be made before the iron horse is permanently installed on the bowsprit. Plate Four shows the remaining spars for the VICTORINE including this club boom. At the inboard end, the lug there carries the large single block which reeves through the block clenched to the ring on the wooden horse I mentioned earlier. You can proceed with this spar, or leave it until later and go on to the bobstays.

BOBSTAYS

Setting up the bobstays will require a number of different fittings. Some are available commercially and others will have to be made. The commercial chain available has oval links.

In order to square the links, it will have to be pulled so that you have approximately 12 links to the inch. The bullseyes are 1/8" in diameter and can be turned up on a lathe or bought, although the commercial ones are a bit on the heavy side.

The shackles must be made since these are only available in much larger sizes commercially. This is not as difficult as one might think. They are made from 1/32" diameter brass wire that has been heated to a cherry red color over a gas flame. A fine nail punch with a 1/32" end is used to indent the wire at 1/4" intervals (Figure 84). Even better, is the use of a heavy darning needle (Photo 5).

The punch flattens the wire while at the same time sets up a location for your drill bit. You need two punched areas for

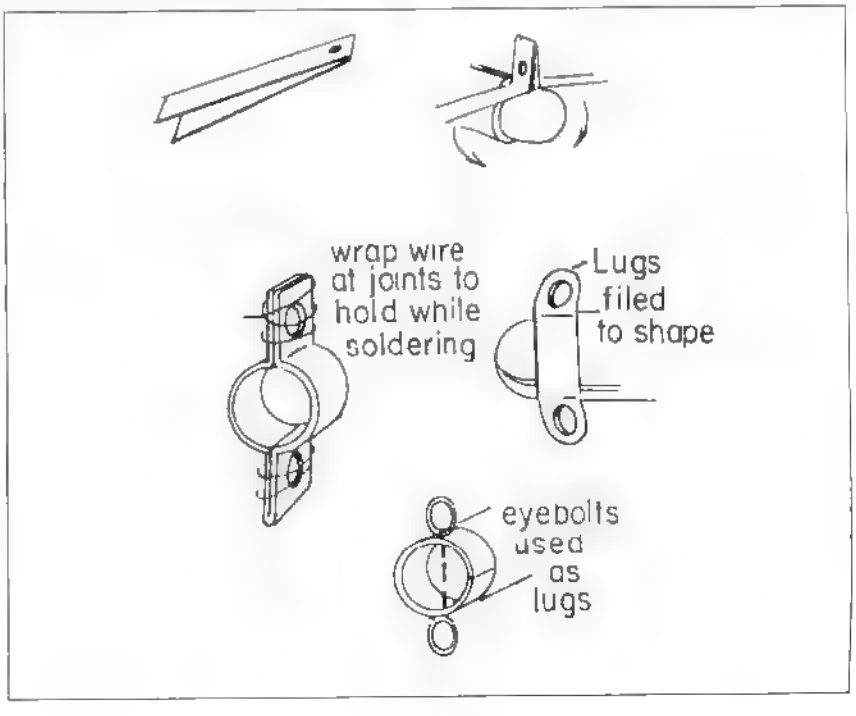


Figure 83

Photo 7 Photo by George Ancona

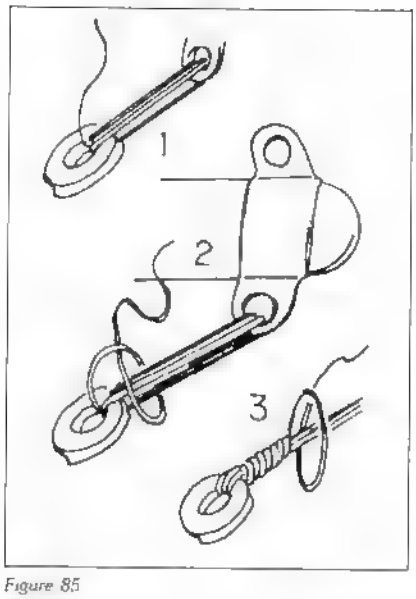


Figure 85

each shackle. The excess material is nipped off after the holes have been bored through. File these smooth across the top and edges of the rounded portion.

The small shackle is formed by holding one end and bending the other with a pair of needle nose pliers (Photo 6). The finished shackle is sitting on top of the anvil. Two of these small shackles are required.

Long shackles are used around the bullseyes and two of these are needed. These must be measured for length on the bullseyes themselves since they are made in the same fashion. At the inner ends of the bobstays are iron straps that are fastened to the stem (Figures 83 A and 83 B).

At the upper end of the lower bobstay, the bullseye is suspended by a pendant seized to it (Figure 85). Several turns are taken between the lower lug and the bullseye (1), the tail is then whipped around at the bottom (2) and then the seizing is put on in the direction of the lug (3), the tail buried and held with a spot of glue.

Just aft of the upper lug are two eyebolts set 1/8" apart which carry a single block each. These should be put on now before the horse is installed. At the lower end of the lower bobstay, there is a short length of iron bar which hooks into the chain length at the fore end. It has its after end flattened and bored for a hole to connect it to the shackle.

The seizing between the bullseyes is left until the bowsprit is installed. The stay that is seized to the upper bobstay's bullseye is put on after the long shackle is linking it to the chain. Allow enough stay material to go up and around the head of the mast. However, coil it back in a neat coil and tie it fast with at least two ties of white thread so that it can be found to cut off later.

Inboard on the bowsprit is a small cleat, but before it is installed the squared portion of the bowsprit should be painted green. The name VICTORINE appears on the outboard sides of the bowsprit, close to the portion that comes round. The lettering is very small and you can use transfer white letters for this if you feel your hand is not steady enough to paint them in. Naturally all the iron work is painted black, so you might want to finish painting this entire area before you install the bowsprit on the hull.

The bowsprit is secured to the stem by means of an iron strap very close to the rail at the bows. It is pinned to the stem then painted black after installation. Photo 8 shows the bowsprit with its iron fittings being fitted in the hull of one of my student's (Troy Tepekian) models.

With the windlass assembly now complete, the wooden horse with its ring and blocks should be installed and the club boom rigged with its block at the inner end. The block on the ring is given an iron strap and banding wire is used for this (Figure 87). You can purchase split rings or make your own from thin copper wire wrapped around a dowel (Figure 86-A) then cut

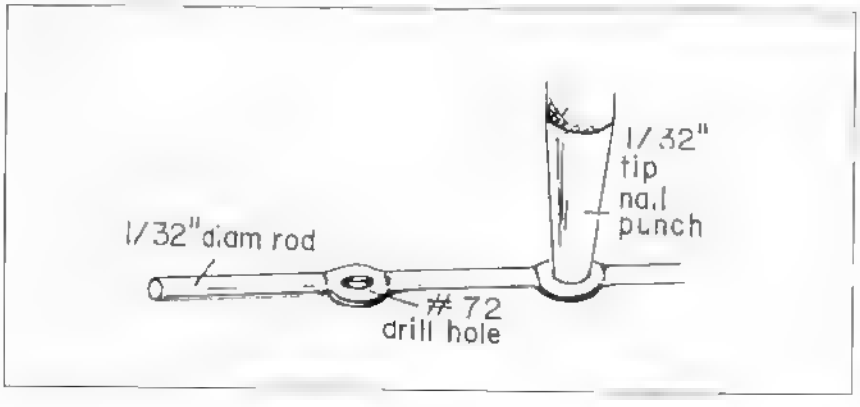


Figure 84

Photo 8

Photo by Stan Blindman

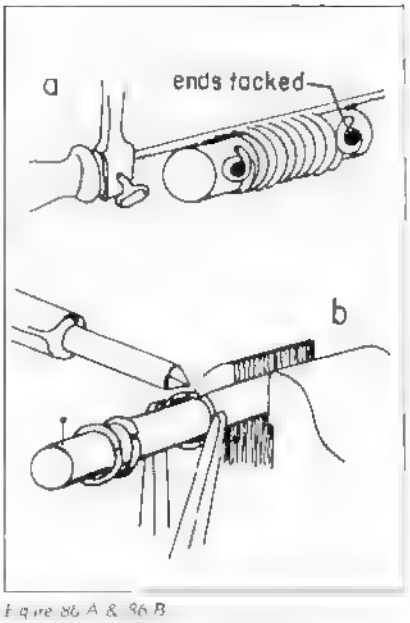


Figure 86 A & 86 B

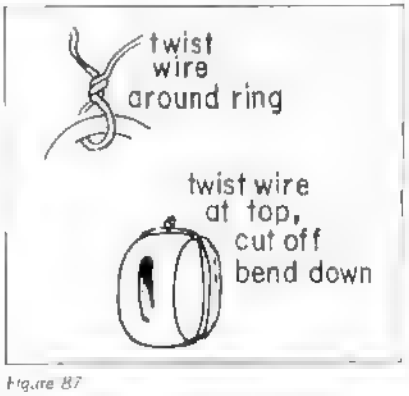


Figure 87

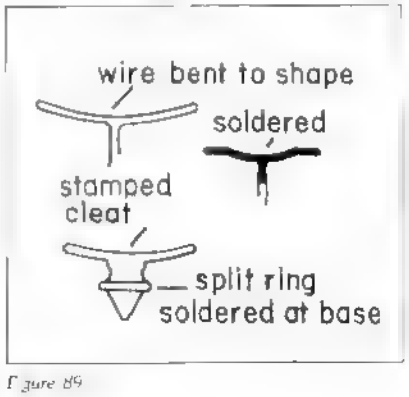


Figure 89

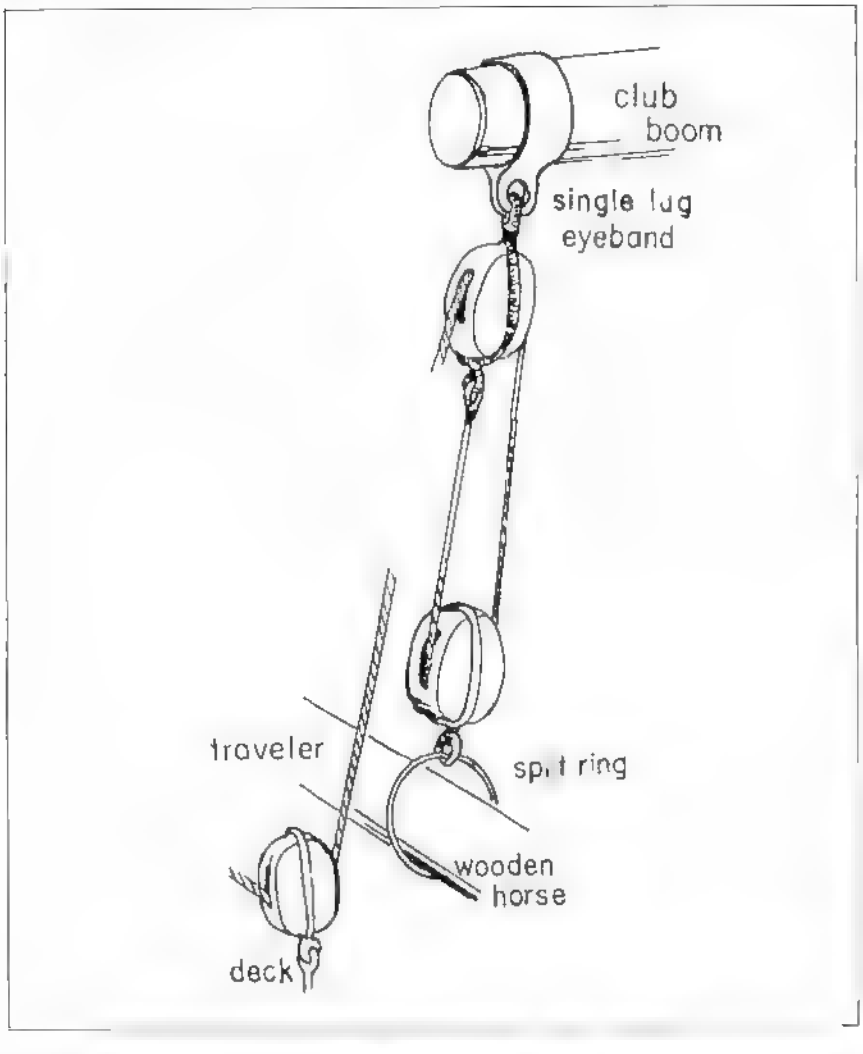


Figure 88

through with a jewlers saw. The loose rings can be left on the dowel and soldered with the dowel held in a vise (B). The ring should be large enough to slide easily and still carry the bight (ring) of the iron strapped block without binding. Figure 88 shows the arrangement of the fall through the single block in the deck which belays to a cleat at the front of the mast.

This cleat and any of the others that you will need can be handled anywhere from filing your own from sheet brass to upgrading the commercial ones (Figure 89). Wire can be bent to shape, soldered and final shaped. However, the most successful method is to solder on a ring of brass at the base of a stamped brass cleat and to let the solder run in to form a fillet between the ring and the sides of the cleat. After painting, it looks the best of all

23

Setting Up Deadeyes

Before working on the spars, the deadeyes should be set up at the rail for the shrouds. This is a de..cate job because the rail is slit to rece ve the straps. These are cut from shim brass that has first been shaped and bored for holes to secure the straps to the sides of the hull

The narrow portion of the strap (Figure 90) is looped around to hook onto a loop ormed from a split ring surrounding the deadeye. The size of these deadeyes for the VICTORINE is 3/16" diameter It may be of interest to those of you who don't know the rule governing the sizes of deadeyes and how the holes are positioned, to see the illustration in Figure 91. The diameter of the deadeye is governed by the circumference of the shroud. Half this diameter is used to locate the centers of the holes for the deadeye The diameter of the hole is equal to 1/3rd the diameter of the nner circle

The slit for the strap is only about 1/16" wide so just use the tip of a #11 X-Acto blade to gently make the insertion Do some wedge cutting from the back side to remove the excess materia. This will be covered by the deadeye once it's inserted into the slit When you get the strap through, gently pull it into position as shown on the sail plan. However, wait for final securing until later when you have set up the mast and are ready to install the shrouds

MAIN MAST

The main mast tapers from the deck to the trestletrees. From there it becomes square in section forming a seat for the trestletree to rest on. There is no reason why the mast cannot be made from round dowel material providing that you find a good straight piece of stock. In genera., these are birch dowels and finished quite well. The length of the mast will be determined by the height above deck since the amount buried in the hull will depend on the depth of the hole you have dri ed

In Chapter 22, I showed a diagram (Plate Four) of all the spars. These drawings can be used or you can go to the sail plan and measure the height of the mast from the upper side of the deck at the center. The upper ten feet of the mast is square in section, with the portion at the doubling (above the trestletree and mast cap) cambered. On the after side of the masthead (squared section) are two blocks carried on mast bands (Figure 93). On the fore side of the mast just below the trestletree is a single block on a pendant, about 3/8" long Then at the base of the mast is the boom jaw rest and mast collar at the deck level (Figure 94). The mast can be left all natural from the deck to the masthead, then painted white from the trestletrees to the cap. The topmast would be painted white at the doubling then left

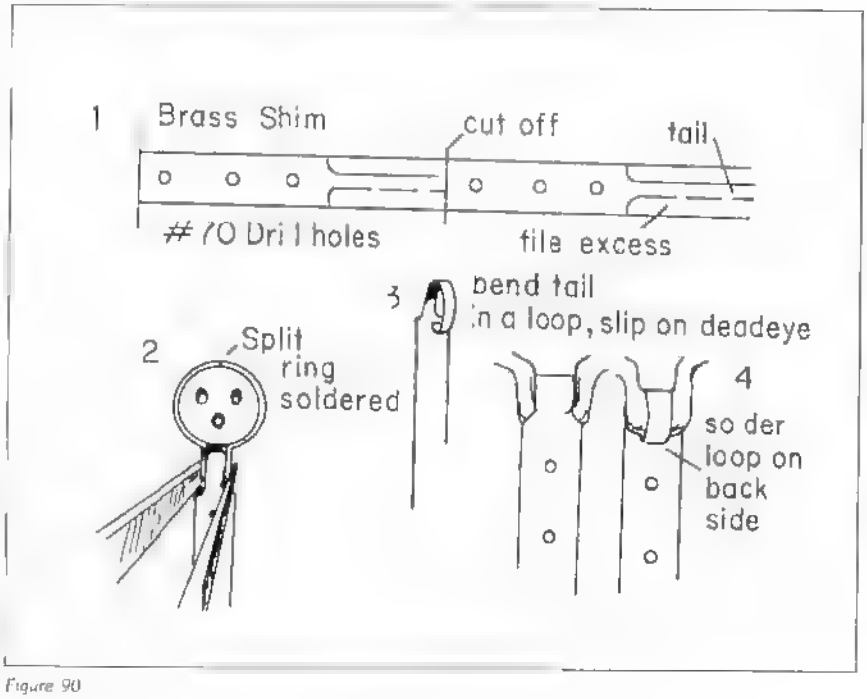


Figure 90

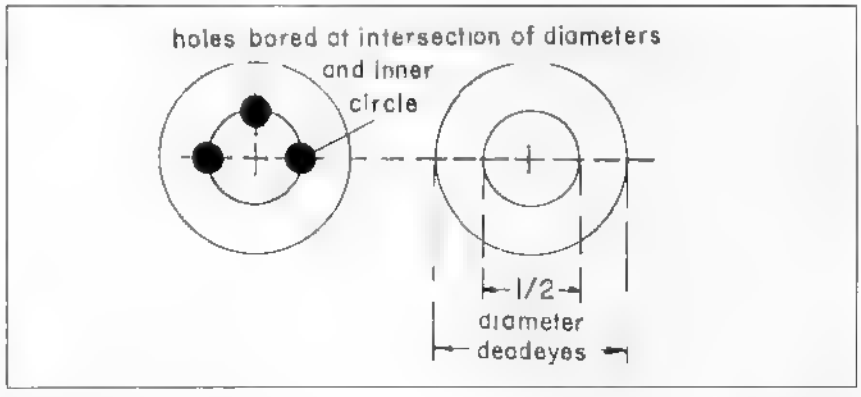


Figure 91

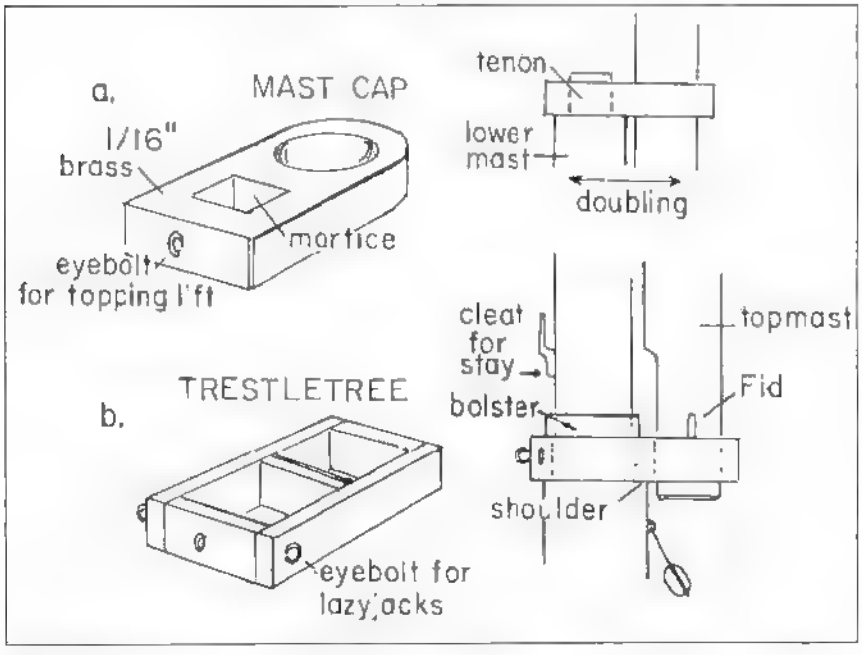


Figure 92

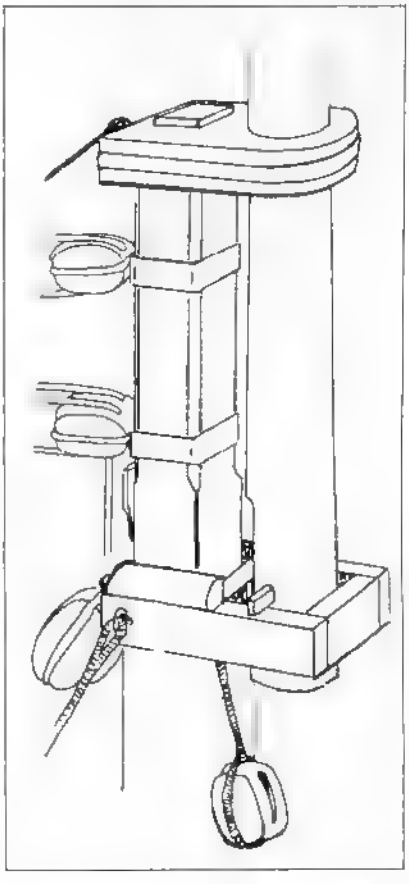


Figure 93

natural above the cap, and white at its masthead

The taper of the mast runs from the diameter at the deck to the top of the masthead. If you are working from square material you will have to first file or plane the mast 8-sided, then 16-sided, followed by a sanding to remove any corners from the file. In either case, after tapering the mast, measure back from the top of the mast head (ten scale feet) and square off this section.

Measure from the shoulder formed by the squaring back to deck level, and score that point with a #11 blade. The portion buried in the deck should be slightly tapered, too, so that you don't have a dry hole without glue.

Try the mast in the hole, but be sure to use the mast jig to check for the rake in the mast. When you are sure of the fit mark off the position of the boom jaw rest. Use its upper side to mark the location. Because of the taper to the mast not only will the mast collar at the deck have to go on, but so will the boom jaw rest and the mast hoops.

Once you have made and installed the mast bands at the masthead, with their blocks, all this will be impossible to do. Both the mast collar at the deck and the boom jaw rest can be made from a wooden spool (Figure 94). Depending on the type of spool, you may have to enlarge the hole before slicing off a ring (a) or they can be made from sheet stock as in (b). The small cleat at the front of the mast is positioned just below the boom jaw rest down far enough so that you can manage to get the fall from the club boom block belayed there. You should also install the single block in the deck now if you have not already done so. The boom jaw rest is supported by slightly curved brackets glued underneath the ring portion. There are about six of these around the mast.

MAST HOOPS

The mast hoops are made from wood shavings wrapped around a dowel and glued. The easiest method is as follows. Use a dowel larger than the widest diameter of your mast with at least 1/16" to spare. Wrap the dowel in plastic wrap. This will prevent the shavings from sticking to it, and secure with scotch tape. Poplar, with its long stringy fiber, can be easily planed from stock with your iron set fine. The shavings will come off in long curls that will naturally wrap themselves around

the dowel. Smear one side with glue and wrap around the dowel and hold until set — about three minutes. Depending upon the width of the shaving, you will need to do this several times. There are at least 13 needed for the lower mast and a dozen or so for the topmast.

For the topmast you will have to prepare a second dowel of smaller diameter. Once all the shavings are wrapped, again wrap the dowel in plastic wrap and secure with tape and leave overnight. When dry, the hoop material can be sanded. Use a single edge razor blade to slice off the individual hoops. Be sure to make several extras. These should appear on the mast whether or not you decide to fit the model with sails and you can eliminate those you don't need after the sails are fitted. In the meantime, you'll have some spares in the event any of them break.

Before installing these, finish the mast painting and give the lower portion a final coat of Val-Oil. Once the hoops have been put on, you will want to pad them to prevent breakage while you install the mast bands at the masthead. Gently wrap them with something soft — tissue will do - and tape over.

TRESTLETREE AND MAST CAP

You have the option to build the trestletree and mast cap from wood or metal. I chose to use brass for the cap and wood for the trestletree. You'll see in Figures 92 and 93 that there are a number of eyebolts carrying blocks on both of these members.

However, there is enough surface area to glue successfully on the trestletree without anything coming adrift. Stripwood is used for this. The width is taken from the width of the masthead and the length from the sail plan. The trestletree is divided into two sections. The aftermost portion is slipped over the masthead and the fore part supports the topmast.

Resting on top of the trestletree is the bolster for the shrouds. This is a half-round section of wood that lies up against the side of the masthead and the top edge of the trestletree, allowing the shroud to ease over in a gentle curve and prevents chafe.

Leave the inner surface unpainted so that it will adhere to the masthead. If you have painted all the way down on the masthead, scrape away some of the paint on three of the sides. The eyebolt on the afterside can also be used to help secure the trestletree if you leave enough material to insert into the masthead. Now, install that eyebolt and those at the sides.

MAKING THE MAST BANDS

The location for the mastbands is taken from the sail plan and should be marked on all four sides of the masthead. I like to score this area with a narrow needle file. It helps to prevent the band from slipping when the wood has dried out. It means

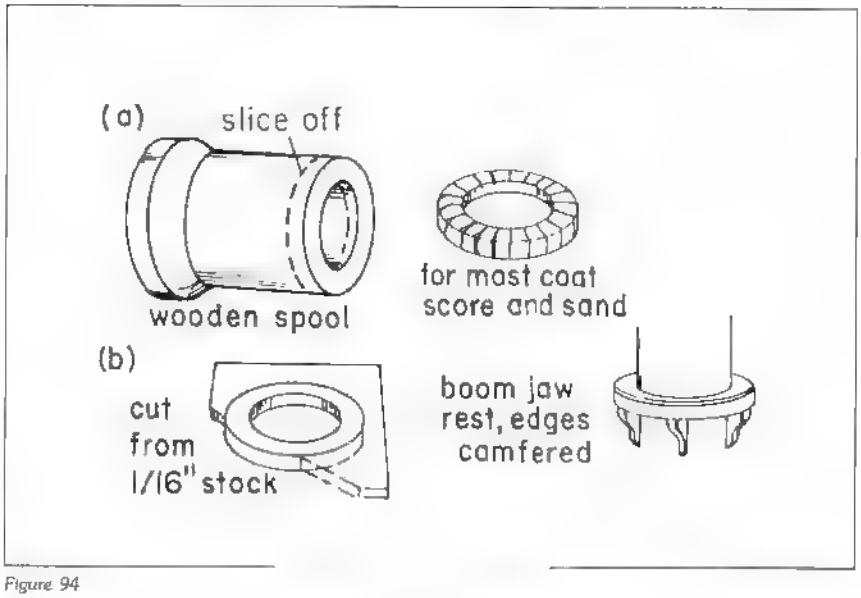


Figure 94

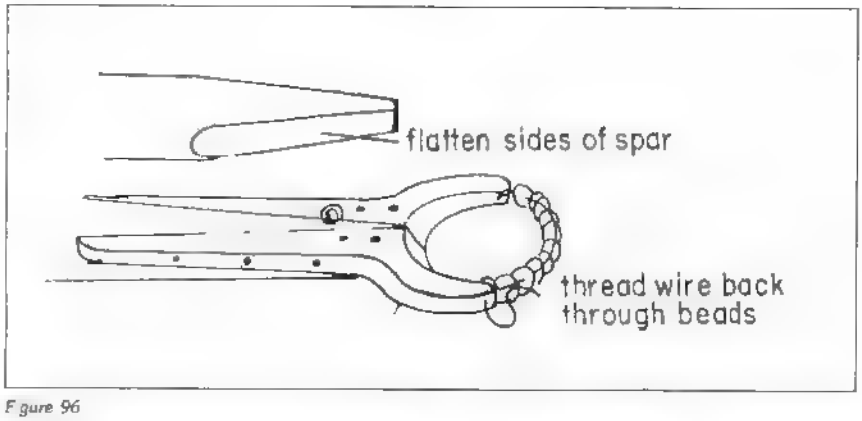


Figure 96

using a slightly thicker strip of shim brass, but the look is really quite good. These bands must fit tightly. Then, after they have been soldered together, they must be bored for a hole. This is tricky work to say the least. There will be some burning of the paint, but if you have kept the coat light it can easily be touched up.

The first step is to soften or anneal the brass in the same manner as was done last time for the spar bands. Use needle nosed pliers to pinch the band material around the masthead, then release it and slip it off. There will be some excess material to nip off, but before you do that, bore one of the tabs you've created by bending the brass, close to the crease. This will give you a starter hole you can use to bore completely through once the band is soldered into position. Nip off some of the excess, but not all since you will need something to hold onto while heating the joint.

The next step is to tin the inner edges of both tabs with solder. Make sure you have cleaned them. Again, use the Tix soft silver solder here with the flux. Just give it a thin layer of solder and allow to cool, then position the band on the masthead. Pinch the tabs together and apply the heat

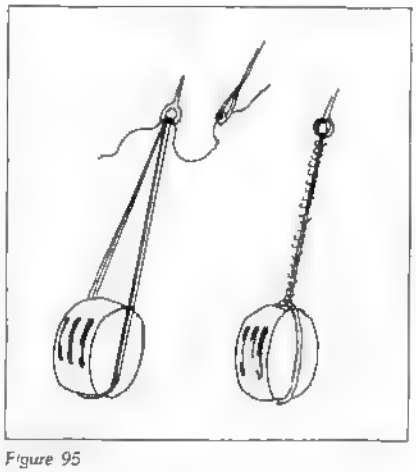


Figure 95

for a few seconds. It should heat quickly and the solder should run bright, but be sure to keep holding it until the solder dulls. Then you can bore through for your hole. Use a #72 drill bit here.

Before making the mast cap you should shape and fit the topmast. This mast is round in section throughout its entire length. Its lower end drops below the trestletree and it is held in position by

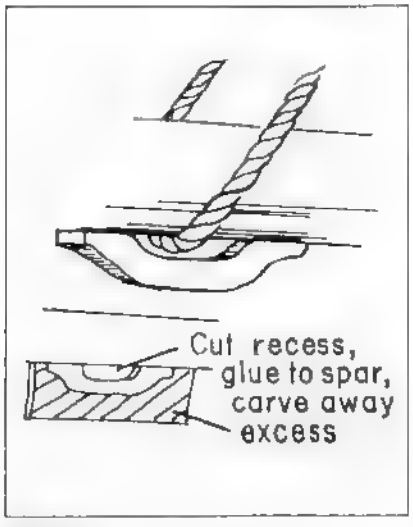


Figure 97

means of an iron fid which runs through the lower portion of the mast at the top edge of the trestletree (see Figures 92 and 93), and the mast cap. At its lower end on the after side, the mast is cut away to bring it closer to the lower masthead

Since the mast cap must be a very tight fit, it's important to shape the topmast now. After you have cut the exact length of the mast, bore the position for the fid, then square the sides The fid is a 1/32" high strip of meta.

Next, bore down through the top of the mast in the center with a #72 dri.. bit Later you will be inserting a round headed pin there, and to have to bore this hole in the reduced area after shaping would almost be impossible. The mast can be tapered and finished at this stage and you will be ready to make the cap

The thickness of the mast cap is only about 1/16" which makes it a very delicate piece to fabricate in wood If, however, you decide to do it that way, begin by boring a hole through some sheet stock the diameter of the topmast Get this fitted first before proceeding to shape the remainder of the cap. Once the hole is right, follow with rounding the front portion, then work towards the back

Bore a pilot hole for the square opening for the lower masthead, and gradually increase the size until you can pare away enough for a good fit. The masthead itself should be slightly reduced where it comes through the cap for a distance a shade over 1/16". If you choose the brass I think you will have better success. Again, heat the brass for easier cutting and boring, as well as soldering Mark in a centerline down the top surface and mark for centers of both the round and square openings, then bore pilot holes and, in general, follow the same procedure as before

This time use a square needle file to open the after hole for the masthead. Bore for the topping lift eyebolt and solder it into position. You can give this a coat of paint before you install it on the masts You can preserve the paint on the metal parts, by the way, by giving all of them a coat of clear varnish, flat or glossy, depending on your preference. Before you leave these masts you should tie on the blocks The method of making a pendant is shown in Figure 95. Ordinary black sewing thread is used here, but avoid the polyester variety since it has a great deal of fuzz

BOOM AND GAFF

The boom is the next spar to make Its length and diameter can be taken from the spar plan in Plate Four or from the sail plan. Its length is measured from the inner end (at the mast) to its outer tip. The position of the sheet block determines the widest diameter (given diameter) of this spar. Jaws are fitted to its inner end (Figure 96), and the spar is secured to the mast by means of a parrels lashed to the ends of the jaws that encircle half the diameter of the mast

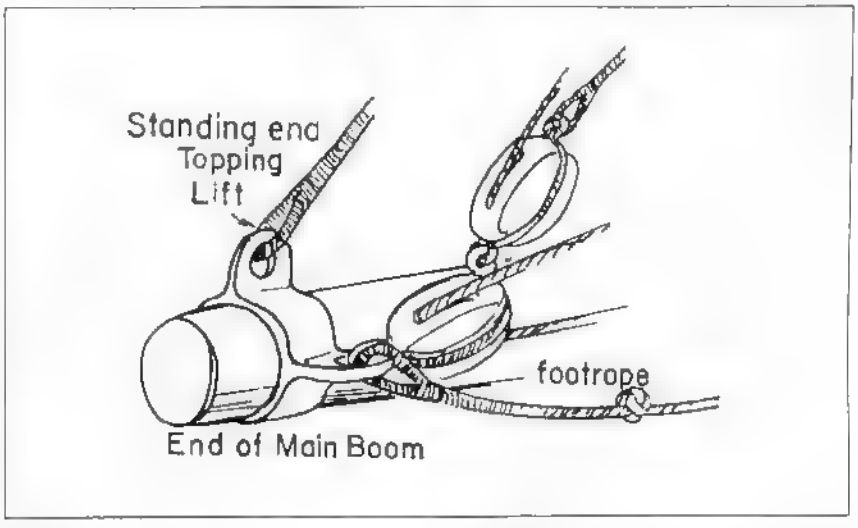


Figure 98

The boom is fitted with two eyebands both with three lugs The eyeband at the outer end (Figure 97) takes the standing end (stationary) of the topping lift (the support for the boom) as well as the ends of the footropes, together with a single block on the starboard side for the outhaul

The eyeband for the sheet block also takes the inner ends of the footropes (Figure 99). On the underside of the boom are three wooden cleats (Figure 97). Cleats of this sort are also used on the club boom However, in that case I used fine wire as a substitute since the narrow spar would not take a wooden one without breaking These cleats confine what are called lazy jacks. Ropes suspended from the masthead to these booms confine the large sails when they are taken in

On each side of the boom there are two cleats. Belaying pins are carried in the jaws close to the inner end and two holes are bored with a #60 drill bit on each side to carry these. The inner edge of the jaws has a taper to keep it from binding

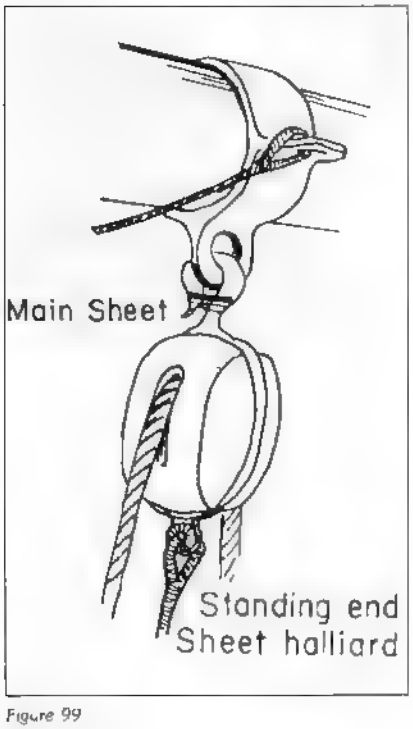
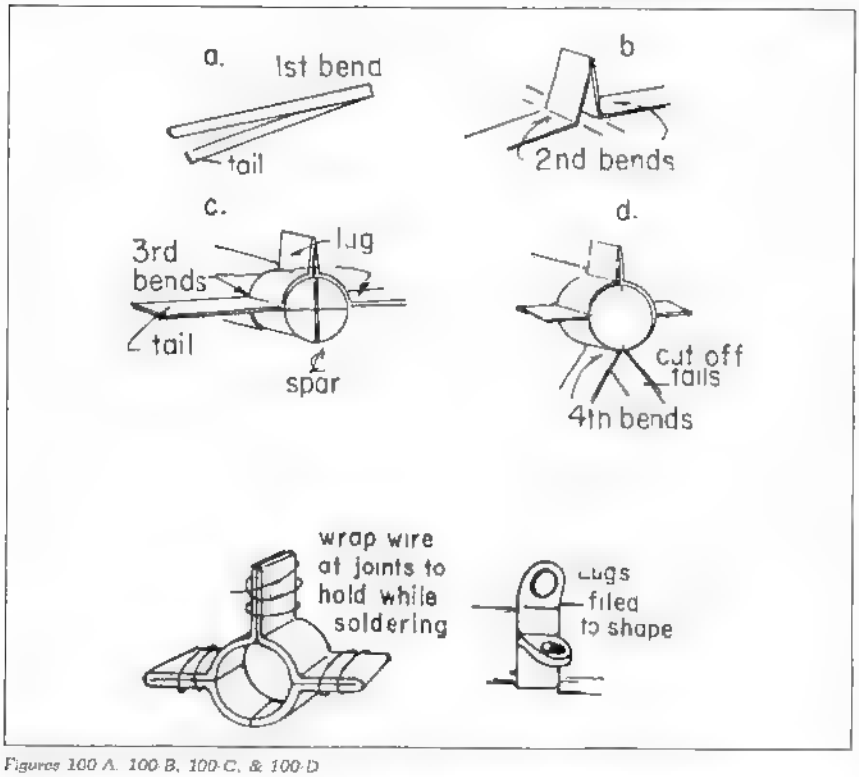


Figure 99



Figures 100-A, 100-B, 100-C, & 100-D

In full size practice this area was covered with leather and greased for ease of operation. At the center of the jaws inboard is a small moveable wedge tacked on to take some of the strain off the jaw rest, and just forward of this is an eyebolt.

After shaping the spar, cut the wedge shape at its inner end, then go on the jaws. They are cut from 1/16" sheet stock, and again it's best to first work the curved section before shaping the remainder of the jaw. These should be pinned and glued to the sides of the boom and then beveled on the inner side.

Boring for the small holes that will carry the parrels rope must be done very carefully. Unless you have used a harder wood than bass wood, these are very apt to break before you have completed the hole. Dark brown glass beads can be used for the parrels. Insert the eyebolt, or tack iron as it's called, and the small wedge or clapper; then go on to making the eyebands.

These are a little more difficult than the eyebands you've made so far because you have three lugs to deal with rather than just two (Figures 100-A, B, -C, and -D). Clean brass, wiring and pre-tinning is the key here. The end of the spar should be slightly reduced in diameter as before. Begin as shown at (A), determine the size of your lug and make the second bend (B). Try the band on the spar to locate the center — then make the third bend in line with the center line (C). Complete the band for the lug and carry the tails to the underside of the spar (D). Pre-tin all the joints, then bind the three lugs with wire and apply the heat.

If you are lucky and have pinched the band tightly, the point on the underside may have also run in successfully. If not, try again, then file the lugs to shape. The eyebands for the sheet is done in the same manner. However, I suggest scoring the spar to hold it as you did at the masthead. Normally, this is a hinged fitting made in two parts, but at this scale you can make it all in one piece.

All the blocks should be tied on this spar and the parrels treaded onto fine iron wire, but in this case, leave some excess and bend it back just to hold it until it is finally installed on the mast. Proceed then to making the gaff. The small cleats shown in Figure 97 are carved from scraps of 1/32" thick wood. I made thin slits on the underside of the boom for these to be inserted into, and again I used brass due to their tendency to break easily. They are painted wood color and are so small no one will really notice the difference when the ropes are inserted. The cleats for the side of the boom can be handled as described before.

The gaff has no ironwork but it does carry two peak blocks. Score the position of these blocks on the spar, then tie on the blocks as shown in Figure 101. First, make a number of turns around the block and the spar leaving enough of a tail to serve over the block and to take some additional turns in the groove made on the spar (A). One or two is enough. Then touch with a spot of glue (B). Tie a knot under the block (C), then serve back to the spar (D). Bury the tail (a needle threader might be necessary here).

On the top and bottom of the jaws of the gaff are eyebolts. Make these from fine brass wire. Turn an eye at one end, allowing enough excess to go through the spar to the underside, then nip off and turn in a second eye. Solder both of these for security. The upper eyebolt carries the single block of the throat halliard and the lower one carries the double block on a span (pendant) for the topsail sheet.

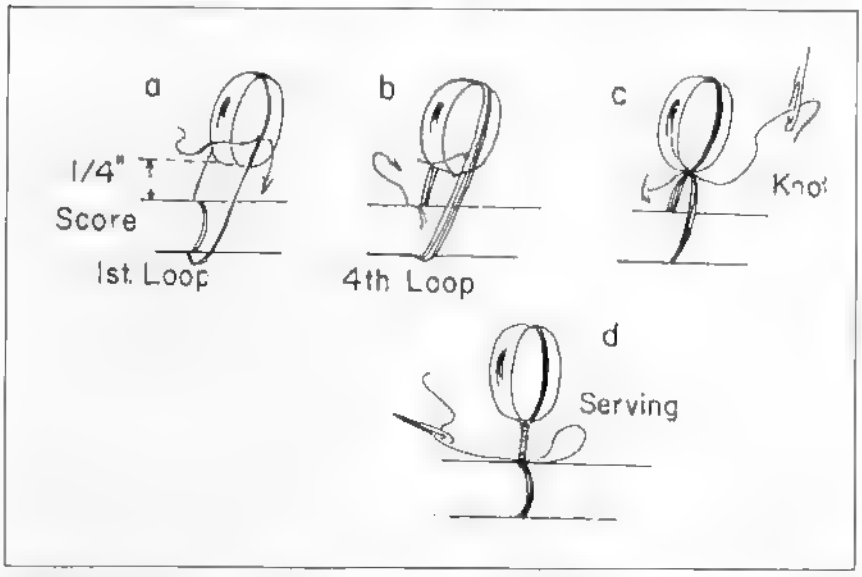


Figure 101

24

Rigging

Before rigging the model can begin a decision must be made about fitting the model with sails. If it is to carry sails, it is better to make and fit them prior to the installation of the masts and spars.

It is important to tie on all the blocks to the spars prior to setting them up. So, a careful look at the sail plan is imperative. From this plan you can work out a rough rigging diagram for each of the spars which would include all the attendant gear and the bearing points.

Photo 9. *Photo by George Ancona*

In the last chapter, I touched on some information with regard to the deadeyes for the VICTORINE. I mentioned that the diameter of the deadeye is governed by the circumference of the shroud line, and that those used on VICTORINE are 3/16" in diameter. This is not quite true since they are a bit under that. Actually 5/32" diameter commercial deadeyes are the closest to scale as the following rule will indicate:

Deadeye circumference = 1-1/2 the circ. of the shroud (6" circ. shroud).

Thickness = 2/3 circumference

Width of the groove — Diameter of the shroud

Holes diameter = 1/3 inner circle;

Diameter of the lanyard — the diameter of the holes

You will have to work out the diameter of all your rigging line since it is measured in circumference on the tables. The formula for the diameter is: circumference divided by pi (3.14).

One of the difficulties in using some of the commercial fittings is their design. Apart from the scale problem, the shape of an object such as a deadeye or block can

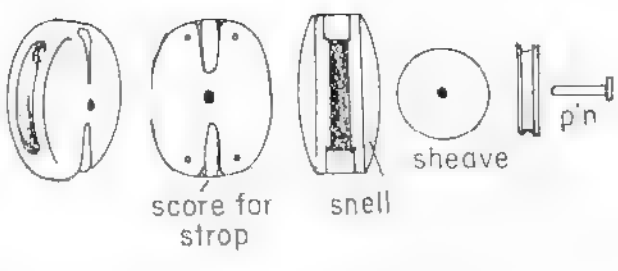


Figure 102

often designate the period. This is particularly true in the case of blocks. Most commercial blocks that are made of wood have squarish corners that have to be rounded as in Figure 102, to make them look authentic for this period and earlier. It's a time consuming exercise but well worth the effort. (Photo 9)

In keeping with this kind of attention to detail you might want to consider turning up the rope for the shrouds and stay (Figure 103). The smaller lines need not be, but the shroud stay and anchor cable all are distinctly visible and are not difficult to do if you use the eggbeater method.

I use a rope-making machine that is inexpensive and simple to use. The angle or lay of the line is both left- and right-handed. In Figure 103, the angle shown is left-handed. On VICTORINE there are three types of line used — two left-hand and one right hand. The difference between the shroud and left-handed cable laid rope is the degree of twist. You'll note the more extreme "lay" or angle in the shroud laid variety.

In the course of rigging your model you will have to splice a number of lines, then seize and serve them over. Eye splices, such as shown in Figure 104, can be done on the larger ropes with little difficulty.

For smaller splices (Figure 105), the lay is opened up by untwisting a portion of the line below the eyebolt or block being spliced and the threaded portion reinserted into the lay and pulled through and snipped off. The splice is then served over and touched with a spot of glue. A handy device for making these small scale splices and servings is a scrap of wood with a 1" long brad tacked at one end. (Photo 10) A splice is being served in this photo and you'll notice that the end of the line has been brought down and secured to the clamp's turning rod. Photo 11 shows a variation on this device with a heavy rope being started. Note that the tails are taped to the side and that the length of the splice has been marked out by contrasting thread that will be cut off later.

To keep the ends of the line from unraveling, lightly coat them with glue and roll them between your fingers. You'll also note in this photo that the extra line has been put through a hole in the board and pulled through underneath the board. This is to put some tension on the rope while it's being worked on but still allowing you the slack necessary to insert the end of the strands being spliced.

In some instances you will want to make miniature straps such as the one shown in Photo 9. This entails making a ring of rope and serving it over as seen in the illustration (Figure 105). Depending on the size of the block and the required bight (ring), various diameter dowels are used. There are always two needed so there is a gap formed to allow the needle to

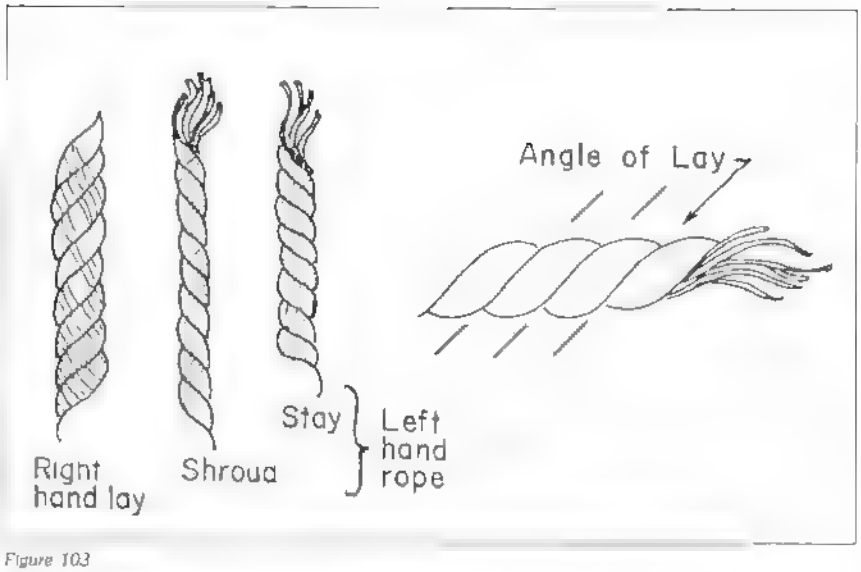


Figure 103

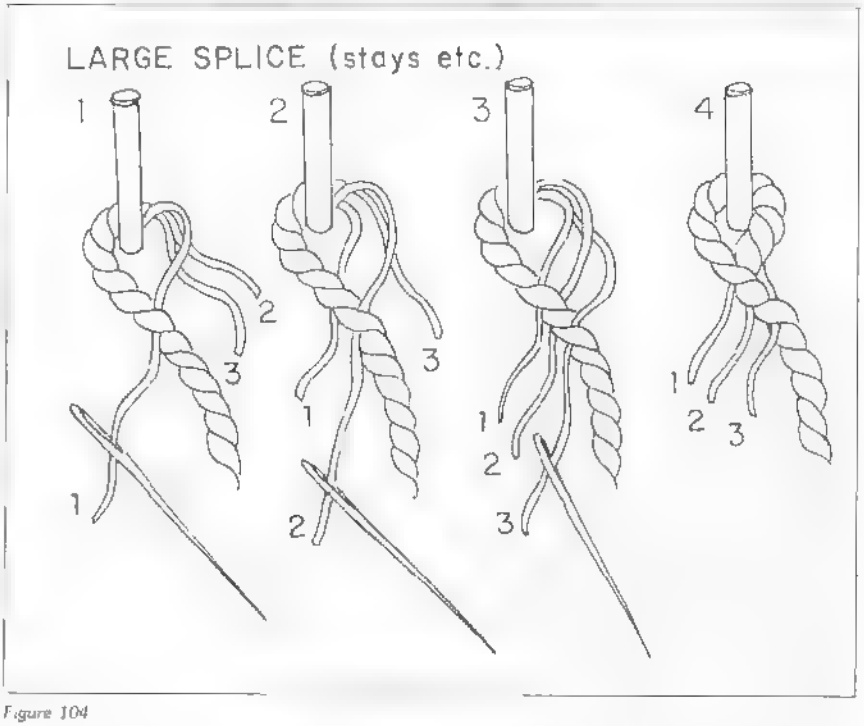


Figure 104

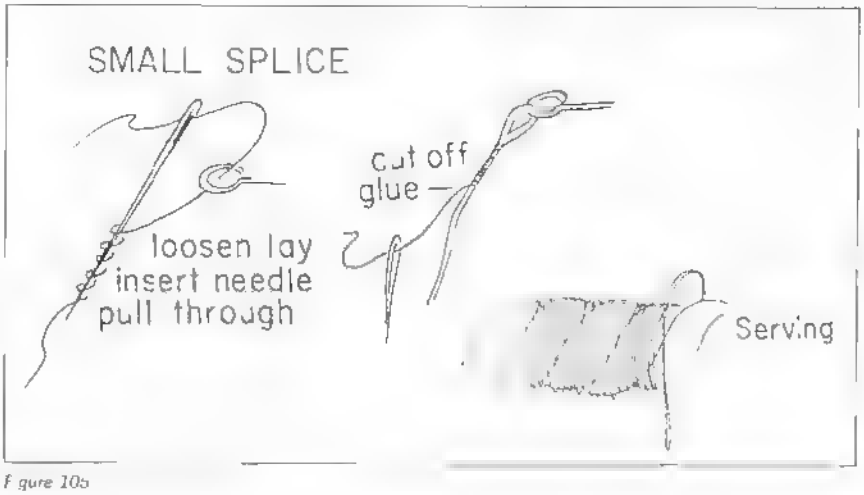


Figure 105

Photo 10 *Photos by George Ancona.*

pass through the loop of line. When the loop is served over, its thickness increases and, on some, passing the needle through and around the loop can be very difficult without this gap.

In general, rigging practices outlined in Murphy and Jeffers' *Nautical Routine and Stowage 1849* were followed for the VICTORINE. This book was reprinted by the Ship Model Society of Rhode Island in 1933, and I think it is still available. Information on the sails and sailmaking came from I.R. Butts' *Shipmasters Manual and Shipbuilders and Sailmakers Assistant, 1864*, *The American Ship Master's Guide and Commercial Assistant, 1836*, and sparring, J.W. Griffith's *Treatise on Naval Architecture 1852*.

The rigging material used for the VICTORINE was Cuttyhunk linen line, still available in some quarters, I'm told. At this time I should also say something about the fabric to use for sails. There are two products on the market that should, in my opinion, be avoided at all costs. They are balloon cloth and silkspan. Balloon cloth is a very heavy weight fabric with a close weave. It might do well on extremely large models, but for models the size of VICTORINE the effect is almost like heavy paper.

Silkspan is a covering used for model airplanes and, while it works well in that capacity, it misses entirely as a substitute for canvas on models. Fabric stores carry a material called "Sail" which is used as interlining on garments. It's available in varying weights and you should try for a medium weight for VICTORINE's sails. Ideally, tracing linen would do very well, but this is not always available to the general public in short lengths.

A sail is made up of a number of narrow strips sewn together. The thread count could be as fine as 24 threads to the inch, to give you some idea of scale. Heavier cloths, called tablings, were sewn in over the strips at various points to reinforce the sail at points of possible wear. In addition, there were in some cases semi-circular patches sewn into the corners as well as long strips running along the foot of the sail for the reef points. Some of these details can be worked into those installed on the model with pleasing results. A bolt rope surrounds the edge of the sail, further strengthening it. Details on

Photo 11

making the sails will be given later, but first I will go back to setting up the rigging of the shrouds

You will want to fasten the deadeye straps to the sides of the hull now before proceeding with the rigging or the installation of the sails. If you decide against the sails you can just carry through with the rigging. You'll note that there are three shrouds a side on VICTORINE and that these do not carry footropes. Access to the masts and rigging above deck was provided by the mast hoops that served as steps. The first two are put over the masthead on the starboard side forming the first pair The second pair is put to port (Figure 106) The third or single shroud leg is spliced into its counterpart on the opposite side by means of an eyesplice (Figure 107)

The first pair is seized just below the lower edge of the trestletree (Figure 108) Its length is about 1/4". Then, put a number of riding turns down the middle of the seizing and bury its end within the seizing. The shroud with the single leg is the furthest aft. The first leg of the shroud is pulled down in line with the first deadeye at the rail and the direction of that leg is marked on the side of the hull. The strap can then be pinned in position. Go on to the second and third leg following the same procedure on both sides of the hull

The deadeyes can be set up after you have fitted the boom and gaff to the mast with the parrels, provided you are not rigging the model with sails. Otherwise they can be temporarily set up to determine the length of the jib stay and topmast stay. Actual practice is shown in Figure 109 and is the method used on most models. To get the space between the upper and lower deadeyes, cut a piece of cardboard strip equal to the space and slip it between the lanyards prior to tightening down. When you've made the necessary adjustments you can secure the lanyards and remove the card.

Above the deadeyes is a pin rack, notched for the shroud legs, that is made in two sections (Figure 110) The inboard section is slightly deeper to allow for the belaying pins, in this case 1/4" long Above the pin rack are the running lights' brackets. These are fastened to the outboard side of the shrouds and painted red to port and green to starboard

Next over the masthead is the long strap for the cargo block, which is seized in the bight. The strap is about 1 3/4" long and is made as shown in Photo 12. Light weight black sewing thread is used to make the strap and to seize the 3/16" block To estimate the size of the dowels you'll need to make your strap take a scrap of light weight line the approximate thickness or diameter of the finished strap and try it around the masthead

Remember, however, that it will have to hold that large block, so give some extra for that and tape it where the strap should end. Carefully separate the line, leaving some of the tape to mark the ends. Cut the line at this point, butt the ends together, and re-secure with tape.

Then try various dowel combinations until you have a pair that will work. If one is larger than the other — better yet Then, tape the end of the dowels together and you are ready to begin your strap. Tie on the sewing thread and then wrap three turns around the dowel before beginning to serve the strap over. Try to keep the threads all with the same tension. Don't pull too hard or you will end up with a very stiff strap. You'll eventually get the hang of it after you've done a few of these (Perfect job to do while watching a ball game!) Once the strap is complete the block can be seized in and the whole assembly slipped over the masthead

Figure 111 shows the method used for securing the standing end of tackle for the lower block if you did not want to splice

Photo 12 Photo by George Ancona

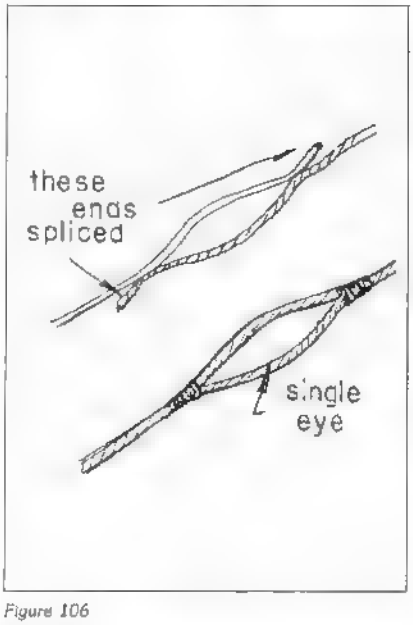


Figure 106

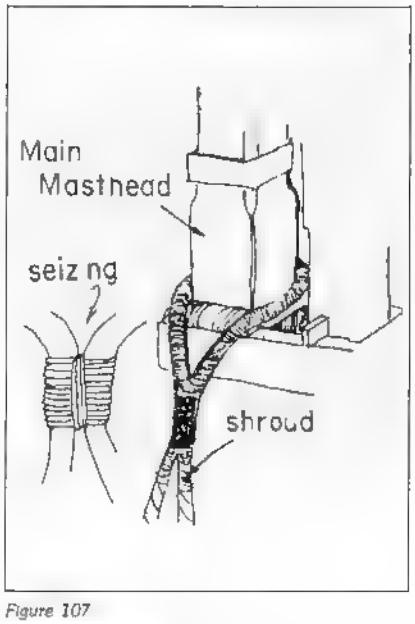


Figure 107

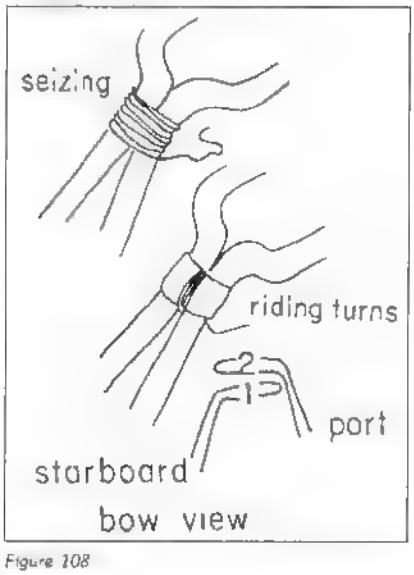


Figure 108

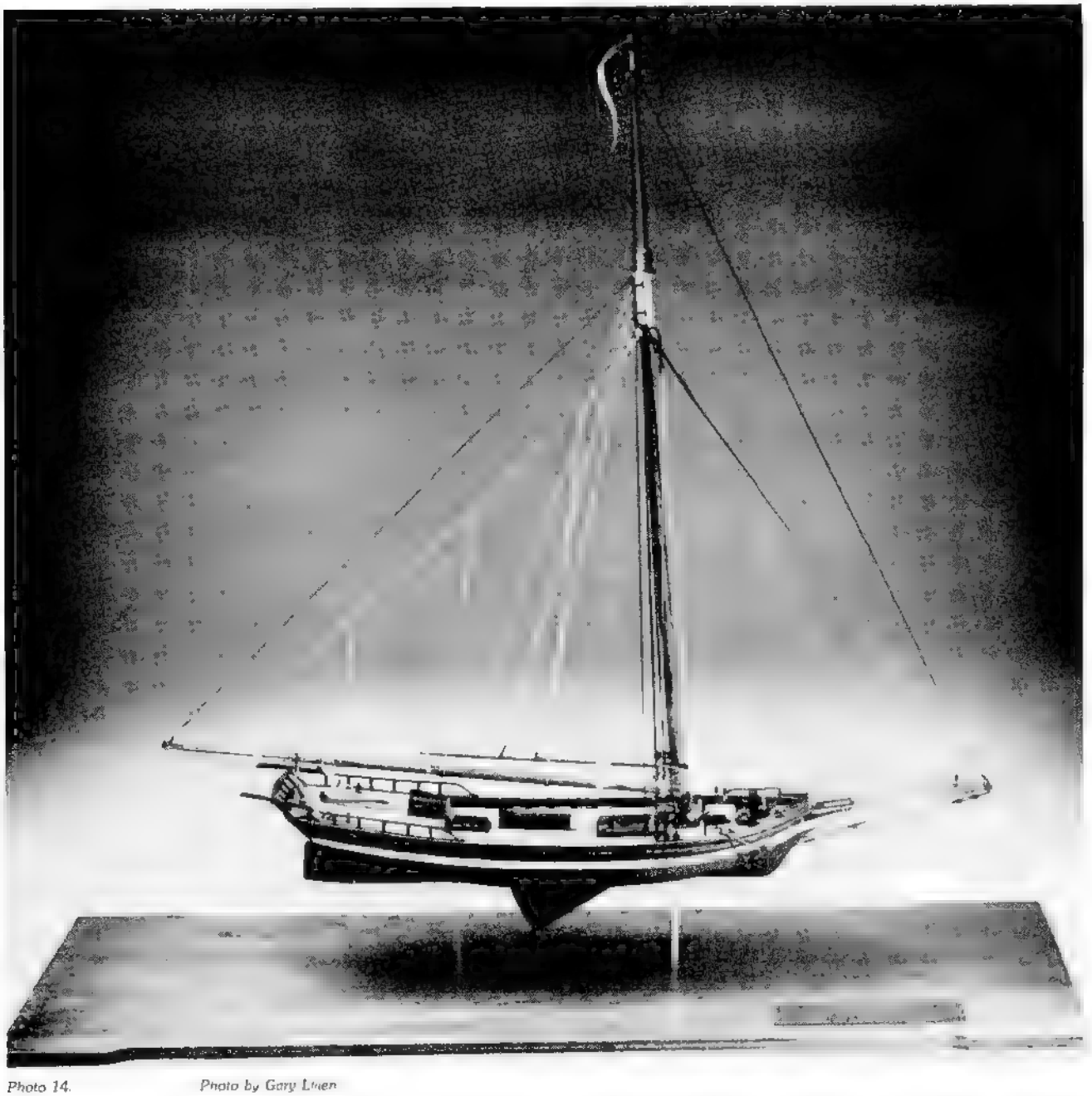


Photo 14. *Photo by Gary Linen*

the line to the becket in the iron straped block. This block is single and carries a hook, belayed to an eyebolt above the cleat. This same method is used on the small block hanging from the pendant just under the trestletrees on the fore side of the mast.

Next over the masthead is the jib stay with a long eye (as so seen in Photo 13). It hooks onto the small cleat below the peak blocks at the back of the mast. Just below the point of the splice is a small single block that gets tied on with the "tail" buried in the splice.

Also buried in the splice is the main line of the lazyjack that is carried down through the foremost cleat under the club boom (there are three of these), then back up to the opposite side on the splice. The splice is then served over throughout its whole length, up and around the masthead, and the tail buried in the serving. If you plan sails for the model they will have to be installed before the lazyjacks. In that case, reverse the procedure and do the serving first. It will make it a little more difficult to bury the line, however.

Without sails you can finish installing the lazyjacks. Photo 14 shows these lazyjacks well on the author's model rigged without sails. Two more are installed and their position is marked on the main one leading from the stay. These are nearly parallel to the mast and fall vertically (see the sail plan). Lightweight white rigging line is used. It must be threaded through the main line on one side, down through the cleat and up to the opposite side. The two loose tails are used to adjust the line, then a spot of glue is applied and, when dry, the tails are cut off flush with the main line using a single edge razor blade.

Photo 13 Photo by Stan Blindman

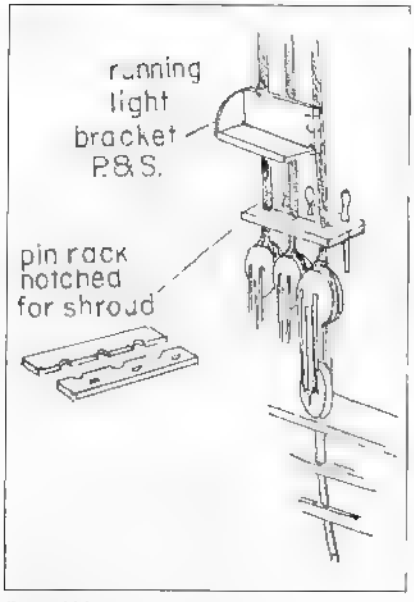


Figure 110.

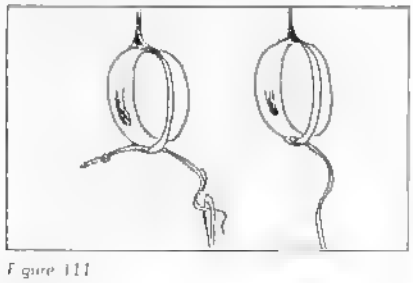


Figure 111

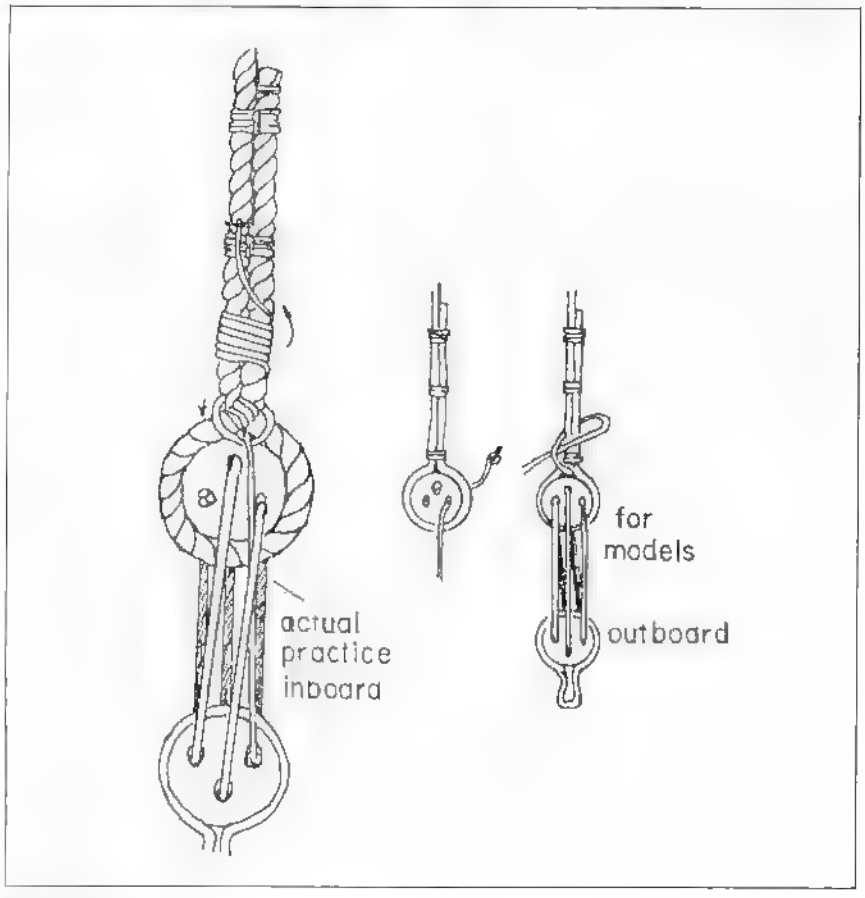
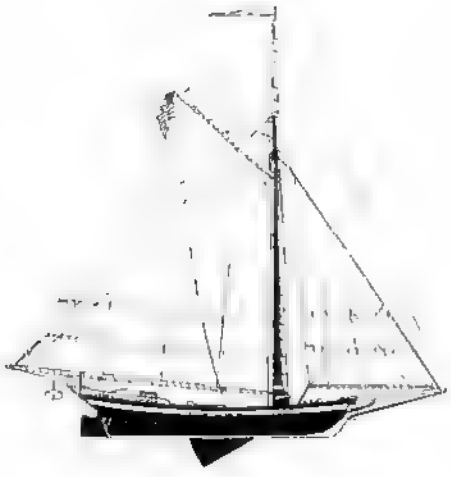


Figure 109



25

Making The Sails

One of the most pleasant aspects of teaching a course in ship model building is the feedback from the students. This often takes the form of new ideas, or better ways to do something

Such an idea was presented by Bob Williams, a student in one of the classes I taught. He came up with a simple and wonderful device to make sail hanks (shackle like devices which are sewn to a sail and allow it to travel on the stay without a snag) see Figure 112.

Williams' fixture consists of a brass rod about two inches long and 1/16" in diameter. At its upper end a small ring is

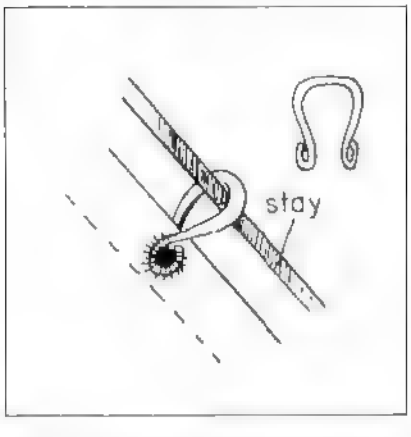


Figure 112

soldered to it about 1/4" down from the top Figure 113 shows the general arrangement

The inside diameter of this ring is 1/32". Another short length of brass rod is slipped through the ring and the whole apparatus is clamped into the vise with the ring with the rod and ring towards the user, Figure 113

These small hanks are about 1/8" long overall and are sewn to the edge of the sail at 1/2" intervals. The wire used to make them is #24 1oz. which comes in eight foot spools. The fixture clamped in the vise is shown in Photo 15. The wire is placed behind the upright rod and on top of the cross rod. It is then pulled towards you, then down around and up over the top of the cross rod

The ends of the wire are nipped off The two rings that have been formed are pinched together with pliers. The cross rod can then be removed and this releases the hank, Photo 16

MAKING THE SAILS

You'll need a piece of fabric 24" x 18" to make all the sails. The general layout for cutting the sails is shown in Plate Five The true shape of each sail is shown on the sail plan. Each of the sails requires a paper pattern. Tracing paper can be used here

You should add 1/4" all around the perimeter of each sail for turnback material. The sails should be laid out on the fabric with the grain running up and down, or parallel to the salvage edge of the material

Although it's not necessary to add this additional step for preparing the sail material, I have done the following for a more realistic looking sail, before cutting them out. Dip the sail fabric in Val-Oil then squeeze out the excess by laying it on an old towel, roll and twist a few times Pin the cloth up to dry overnight and the next day, go over it with a warm iron to remove most of the wrinkles Be sure to use a layer of brown paper between the fabric and the ironing board. Also have a layer of brown paper between the iron and the sail fabric You can now arrange your patterns and cut out the sails

The seams are lightly marked in pencil on the front side of the sails at 1/2" intervals The sail plan gives the directions of these seams for each of the sails The turnback should also be marked around the perimeter because the seams will be stitched in by machine and they will stop at the turnback If you like, you can leave excess material around the edges of your

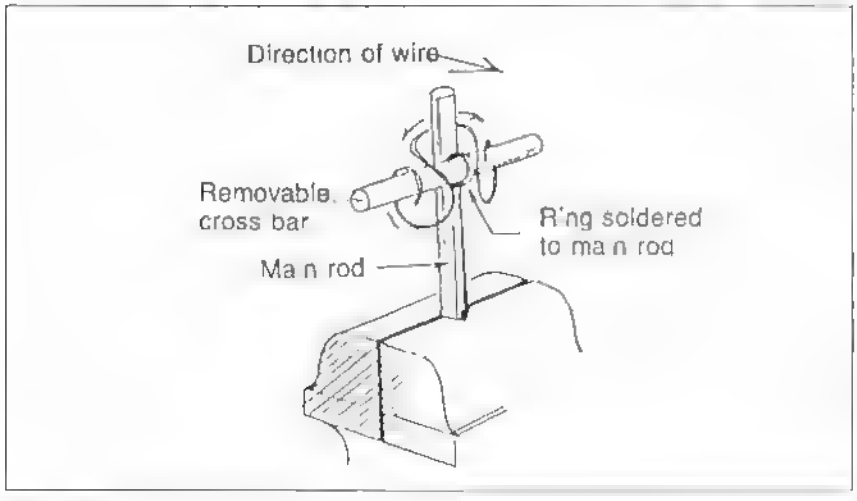


Figure 113

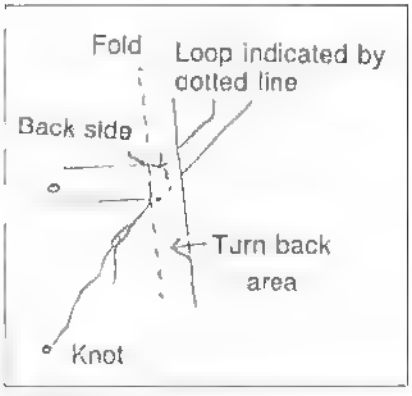


Figure 115

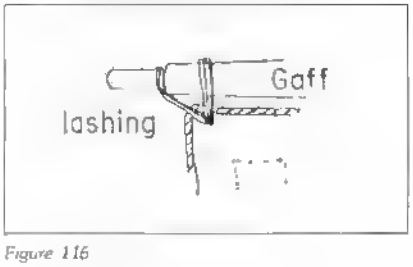


Figure 116

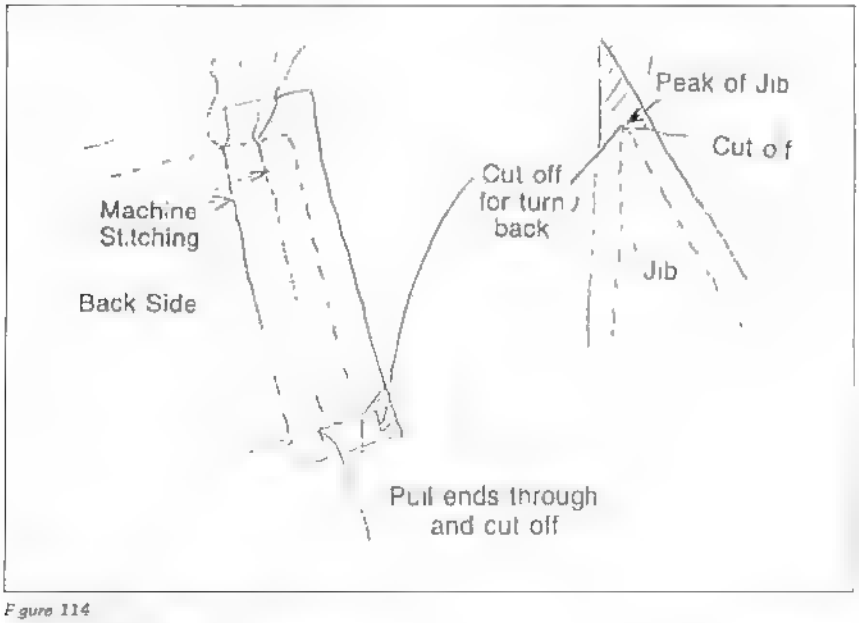


Figure 114

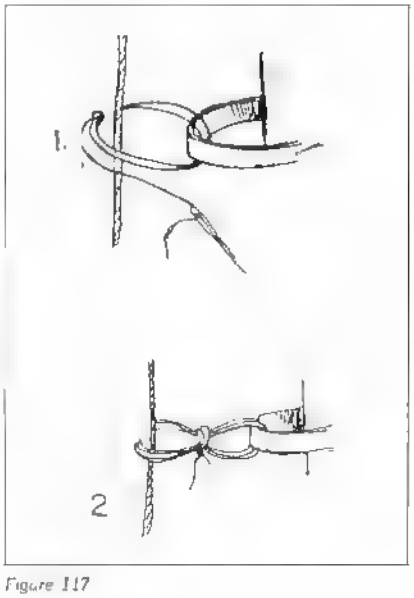


Figure 117

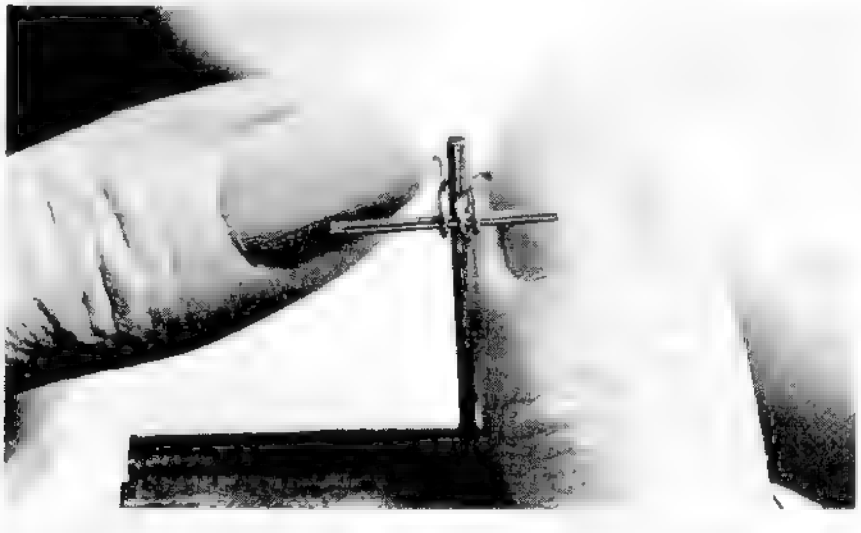
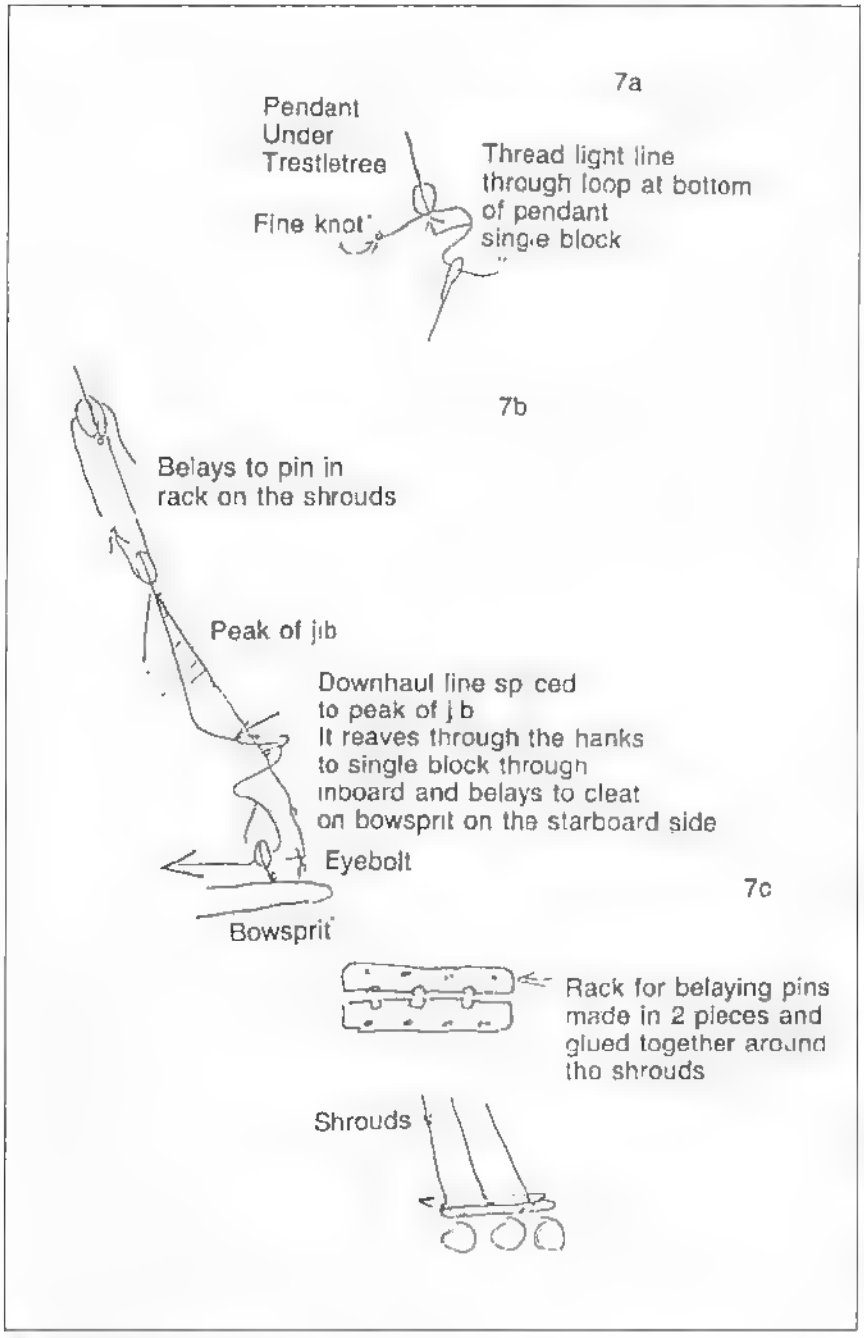


Photo 15 Photo by George Ancona

sails and trim what is not needed after you have put in all the seams as is shown in Figure 114.

The next step is to turn the sail over and pull through all the threads and tie them off. Trim them close to the knot and then trim the corners back so that they will lie flat, Figure 114

Next, mark the position of the reef bands on the main and jib sails lightly in pencil. A band 1/8" wide is glued to the backside (or starboard) side of the sail, up



F gures 118 A, 118 B & 118 C

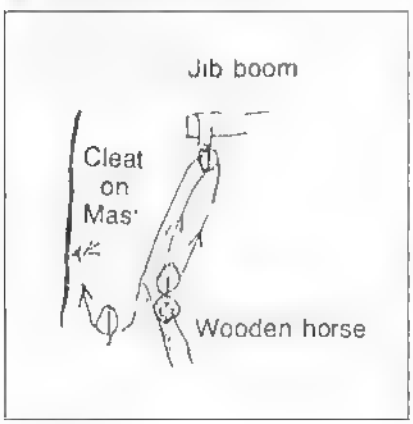


Figure 119

to the edge of the turnback

At the end of the reef bands on the after leech of the main sail, a loop is formed Figure 115, and worked over with a blanket stitch. These are cringles at the edge of the sail and should be put on the fore side of the sa.. with enough slack to secure them to the bolt rope after it's been applied

Mark the position of the holes for the reef po nts on the bands at the midd.e of each seam, then punch through with a threaded need e knotted a few inches up from the end Light weight rigging line can be used for th s.

Pull the knot up to the mark on the reef band, turn the sai, over and knot the opposite side. Then it is cut off leaving a 1/2" tail. Wait until the sails have been put on the masts to glue cown the reef points They should hang naturally and just a touch of glue will hold them

Next, glue down the turnback around the edges of the sail to the back side. The curved portion of the topsail will have to be nipped back to the turnback line to make a smooth curve

Once the turnback is dry, you can apply the patches at the corners and tabl.ngs indicated in Plate Five Then, you will be ready to apply the bo.trope The line used for the bo.trope is approx mately 1/32" in diameter Although different diameters were used on the actual sails, yours can all be one diameter, It is best to boi the line to remove the sizing and make it more phable. Put some light we ghts on the ends when you hang it to dry. It shouldn't be stretched because it will shrink back after you have put it onto the sails.

Use a sheet of heavy cardboard or scrap p.y as a work surface and cover it with some plastic wrap. Pin the sail in position so that it won't shift while you're working on it. The boltrope is not spliced together on the mode.. It should be butt joined at the foot of the main and jib sai and at the tab.ng on the topsail

Start by dipping one end of the rope into some glue and pressing it against the edge of the sa.., until it holds. Then, work in a small amount at a time until you are ready to turn the corner At the corner you'll have to give the rope a hard pinch to make it turn - and s.ay in position while gluing it After circling the sail, cut the butt e nd with a single edge razor b.ade. Once all the sails are finished a ow them to set and dry overnight. Before going further, you should secure the cringles to the bo.trope at the edge of the mainsail on its after edge

SETTING UP THE SAILS

All the sails are set up, with their rigging, prior to installing the masts on the model Loose lengths of line must be coiled up and out of the way as you work. Use light colored thread on black coils and black thread on all your light rigging lines The sails are fixed to their individual spars by means of lashings (Figure 116), hoops (Figure 117), hanks which were mentioned earlier, and by whipped lashings. These are fixed at the head and foot of the main and foot of the jib sail I'll cover each of these individually, but first I should cover someth ng about terminology that relates to rigging

Most beginners have difficulty learning and remembering the terms associated with the rigging of a ship model I have always suggested that modelers purchase a dictionary that will help in understand ng rigging terms, as well as other ship terminology. *A Dictionary of Sea Terms* by A. Anstead is what I recommend. While not completely comprehensive, it will give

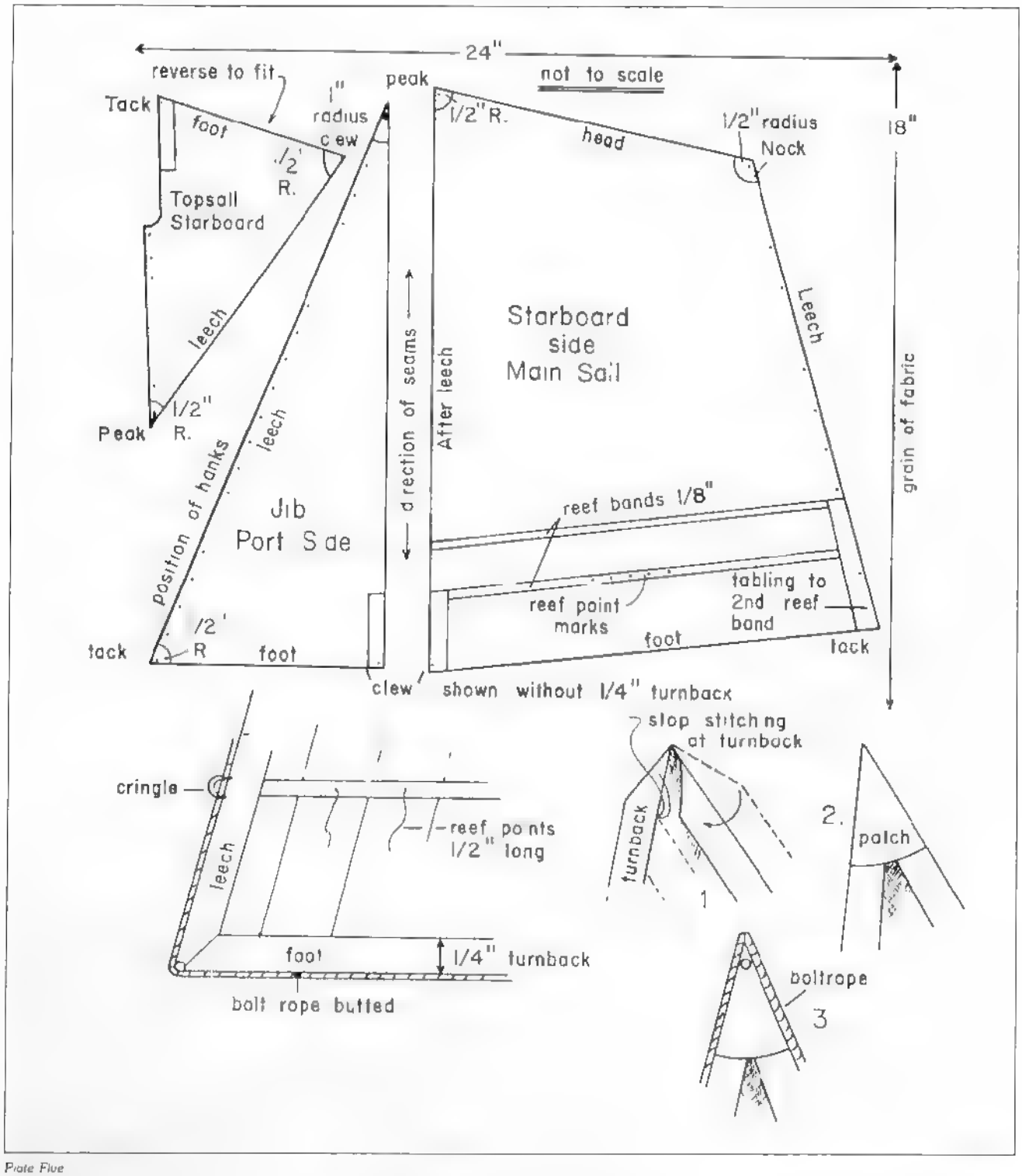


Plate Five

you an introduction to the terms I will be using.

In the last chapter, I covered some of the procedures for rigging the model without sails, but some of that will be included now as well. To start, check to see that the sails have all the necessary gear installed on them before setting them up on the masts. At the jib, this should include all the hanks on the fore edge. As an added precaution, mark the position of the lashing to the foot of the sail.

This can be taken from the sail plan. Repeat this process for the main sail as well. A small single block is lashed to the peak of the sail for the outhaul. The standing end starts at the bottom of the pendant block, which reeves (runs) through the peak block, back up to the pendant, then down to the rack on the shrouds for belaying. Figures 118-A, -B, & -C). Lightweight rigging line is used for the downhaul. A second line is spliced to the peak of the jib for the downhaul. Setting these lines up for the jib will have to wait until you have installed the main mast. However, the sail can be lashed to the club boom and to the tack iron at the end of the bowsprit.

You will see in my sketches that the tack iron in the sketch is an eyebolt. The inboard end of the boom carries another single block set up in the same manner as

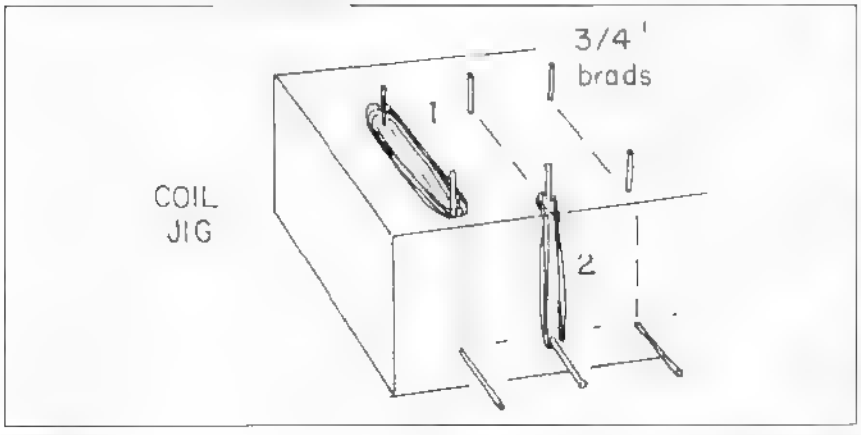


Figure 120

Photo 16 Photo by George Ancona

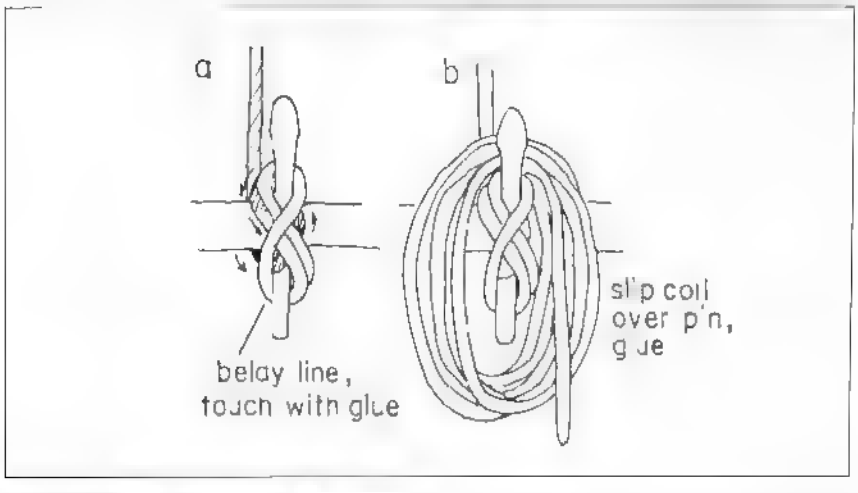


Figure 121

Photo 17 Photo by Stan Bindman

the mast pendant, Figure 119

Be sure you have the cleat installed at the front of the mast below the boom jaw rest. Also make sure the wooden horse is also rigged to be set up now. A great help in handling these small lines is a needle threader. Have a half dozen on hand while you're working, since they bend easily.

You should prepare yourself with several large eyed but fine darning needles that will be used for installing blocks. Four will be used for installing blocks. For particularly fine work, you can make your own from beading wire bent in two then twisted to form an eye.

SETTING UP THE MAIN SAIL

This sail is lashed to both the main boom and the gaff. In Chapter 24, I covered installing the blocks on the gaff and boom. The lashing for the gaff is shown in Figure 116.

After you have sewn on the mast hoops, the sail must be slipped over the mast before proceeding. You can then lash both the head and foot of the sail to the gaff and main boom. Both of these spars can be secured to the mast temporarily with the wire from the parrells in the jaws. However, wait to finally secure them until after the mast itself has been set up.

You will remember that I mentioned the topmast would have to wait for installation until after the main sail was installed on the lower mast. The top mast can now be set up following the procedure outlined in the last chapter. The lazyjacks for the jib and main sail have to wait until the main stay is installed.

The nock (upper right hand corner) of the main sail is lashed to the eyebolt under the jaws of the gaff. Its peak is lashed to the outer end of the gaff as seen in Figure 116. The tack, the lower inboard corner of the sail is lashed to the eyebolt in the jaws of the main boom.

Beginning at the jaws and working outward lash the foot of the sail to the boom. If you don't, the lashing will loosen and the sail will become slack on the boom, making for a sloppy job. For the time being set all this aside and install the deck furniture. This will be difficult to do once the mast has been set up.

INSTALLING THE MAST

If you have not made a mast jig for the proper rake of the mast, do so now.

Photo 18.

Another pair of hands is helpful at this stage but it can be done alone.

Slip on the mast coat, but tape it up out of the way until the mast has been secured in its hole. You might want to leave the hatch behind the mast off until the mast is installed to get the correct angle. Use paper wedges to get the mast in line with the centerline and with the correct rake. You should allow 24 hours for the glue to set before working further on this mast. When the glue is dry, release the mast coat and glue it to the deck along with the hatch abaft the main mast.

The pendant on the fore side of the masthead and the main stay should be set up as detailed in the last chapter. The cargo hook should also be installed now. It falls about an inch below the trestletrees on the fore side of the mast. The jib stay can be installed now following the procedure outlined in the last chapter.

An additional single block is lashed to the stay at the 8th hank. This carries the inhaul which has its standing end (beginning) at the clew of the jib on the starboard side. The jib and its gear can be completely installed now, including the lazyjacks as outlined before.

Next to go up is the topmast stay. This stay is eyespliced at the head of the main topmast. It leads down to the end of the bowsprit and is spliced to the eyebolt there (Photo 18). This splice is put on after the shrouds are set up. For now, it can be tied on as seen in the photo.

The shrouds are next up over the masthead and are installed as outlined before. If you have difficulty setting up the deadeye lanyards try slipping a piece of cardboard between the upper and lower deadeyes and adjust them for the right tension before finally tying them off. The cardboard is then slipped out and they all will have uniform distance between them.

Another handy tool for rigging is shown in Photo 19. A small hooked wire is inserted into a 1/8" diameter length of brass tubing. Its opposite end has a small loop bent into it to grasp for maneuvering the lines in tight places. This is very helpful for belaying operations such as this.

Another trick to belaying coils of rope on belaying pins, and to make them lay flat as shown in Figures 120 and 121. The coils are first made in a jig. Brads are nailed into the top of a scrap of pine at a distance apart equal to the length required for the coil.

The line used is first dampened, then wound around the nails. After these have set, the coils are moved to the edge of the jig and a second row of nails is hammered into the side of the block to hold the coils in position until set. Redampening is a good idea before step two is begun. The lines are then belayed (Figure 121-A) and touched with a spot of glue, bringing the tail end around and under the belayed portion. The coil can then be dropped over the belaying pin with a spot of glue and left to dry overnight.

Once the shrouds have been set up the pin racks for the shrouds can be made and installed on the shrouds. The running light boards can wait until the end to be installed. These are very delicate pieces of gear. They do not, by the way, carry lanterns except by night. When carried

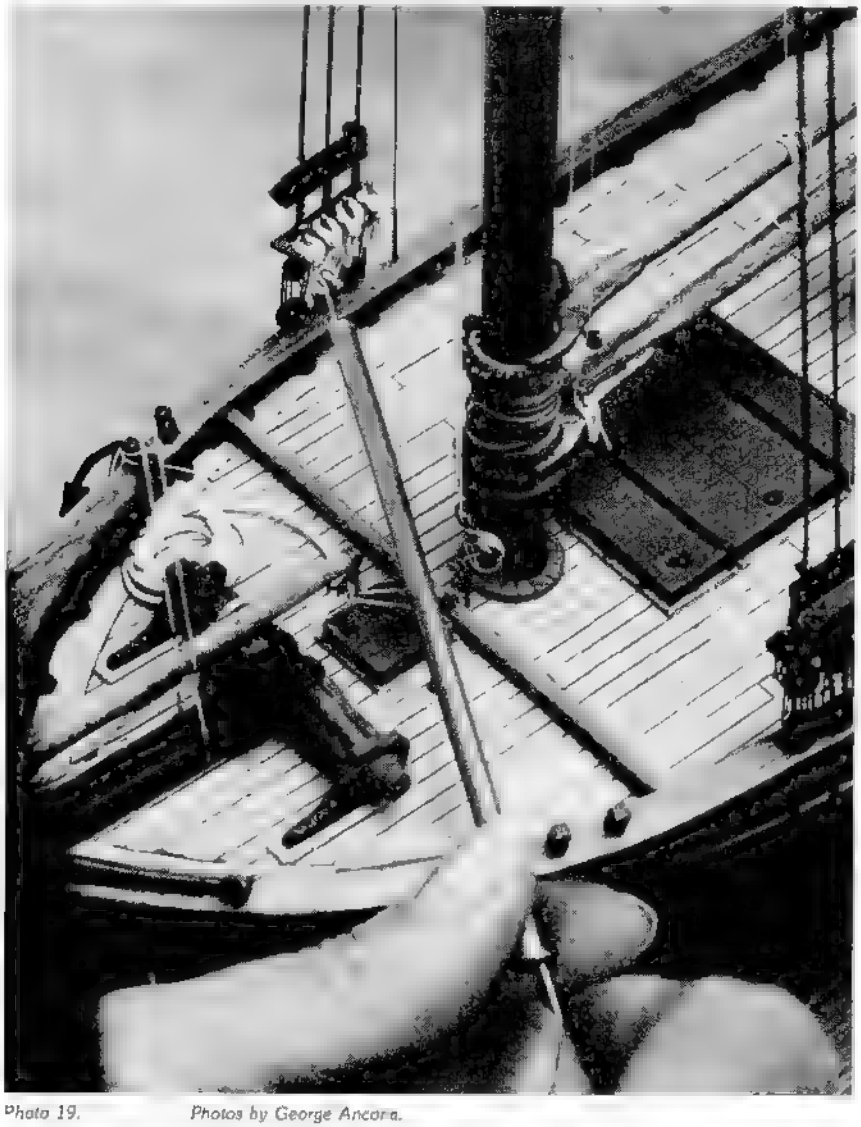


Photo 19. *Photos by George Ancona.*

Photo 20 *Photo by Gary L. Ilen*

they would be tied on as well.

In Photo 20, there is a model from the first class I gave using VICTORINE as a subject, this time with sails. Since often a picture is worth a thousand words I've included it for those of you about to rig your models with sails in order to give you something to shoot for and to give you some idea of the overall look of the model in this state.

The rig of these Hudson River sloops changed little over the years as evidenced by Photo 21, a later sloop. Photo 21 was believed to be the VICTORINE, but shows both spreaders, a cast iron helm, raised cabin trunk on the quarterdeck, and turnbuckles on the bobstays. All this gear was typical of sloops after 1860.

The enrollment papers for VICTORINE do not document the changes in her hull other than the reduction to a barge in her declining years. Without this information, there is no way to substantiate the photo as being of

Photo 21. *Courtesy of Sea History*

VICTORINE with changes in 1860 or later. It is documented that this is not how she appeared in 1848.

COMPLETING THE RIGGING

To keep the mainsail and topsail in position you will have to set up the gaff and its peak halliards, the topping lift, and finally the lazyjacks. The pin racks on the shrouds should be installed by now. All the blocks connected with the main sail should also be done and, if you have not installed the iron horse at the stern, it must go in now.

The peak halliards are begun by splicing the standing end around the outer end of the gaff using lightweight rigging line. The position of the standing end is shown on the sail plan. It leads to the uppermost single block at the masthead, then reeves alternately back to the gaff.

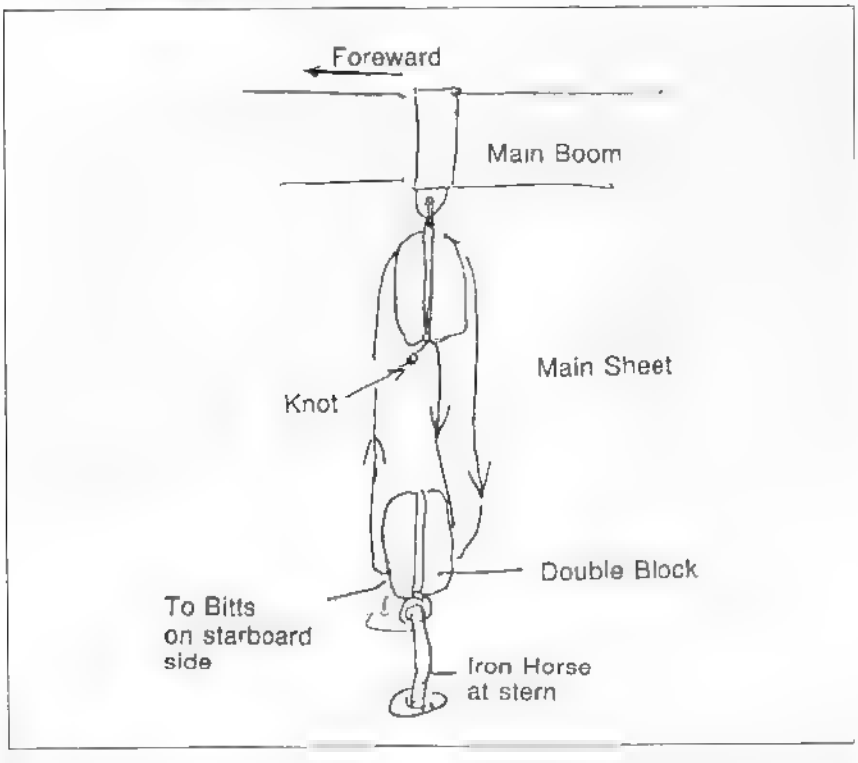


Figure 122

and then to the double block at the masthead. Next it's back to the peak block on the gaff, back to the double block and down to a single block seized to an eyebolt in the deck abaft the mast on the starboard side, and then to a belaying pin in the jaws of the boom. This will bring the main sail into position but allow some slack until the topsail is set for adjustment.

Next, set up the main sheet (Figure 122). Slip a length of lightweight knotted rigging line through the bottom of the strap that holds the sheet block to the main boom. Bring it down to the double block on the iron horse at the stern, then back to the sheet block on the boom. The fall, or leading end goes through the second sheave and belays to the bitts on the starboard side. Again, leave a little slack in the belaying line so that there is not too much tension on the belaying points yet.

The topping lift is next and it will control the end of the boom. Begin by belaying a long length of lightweight rigging line to a pin in the rack on the shrouds on the starboard side. The topping lift pendant susperded from the masthead can now be set up with its fall at the end of the boom. Splice the standing end of the fall to the eyeband at the end of the boom. Bring the leading end (loose) through the single block at the end of the pendant. A single block is spliced into this end and you will have to take a look at the sail plan to get the distance between it and the topping lift block (Figure 123).

Splice a length of lightweight rigging line is knotted and slipped through the strap on the bottom of the topping lift block. The leading end reeves through the port sheave in the double block on the boom and back up to the topping lift block. The fall goes through the starboard sheave then leads forward to the aftermost cleat on the starboard side of the boom.

Next, the outhaul can be rigged by taking a length of lightweight line and splicing it into the clew or outer lower corner of the main sail. Bring the leading end through the single block hooked at the eyeband on the starboard side — then forward to the forward cleat on the boom.

Before setting up the topsail you should rig the throat halliards on the gaff (Figure 124). Its position is shown on the sail plan. Begin by belaying one end of a long length of rigging line to a belaying pin in the jaws of the boom on the starboard side. Bring the leading end up through the starboard sheave in the double block at the trestletrees. Take the leading end down to the single block in the jaws of the gaff, but this time take the leading end through from aft to forward (Figure 125). The leading end goes back to the block at the trestletrees, then down to a single block in the deck on the port side. Finally, it goes to the pin in the jaws of the boom.

If you have rigged cringles on the after leech of your main sail, you can tie on a long length of line at these points. Lead them through the blocks suspended from

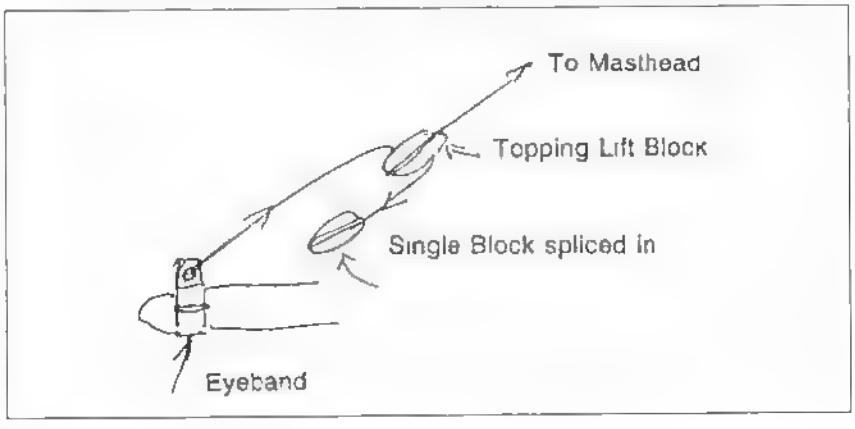


Figure 123

the gaff and the hoop at the mast. Remember that these double, so when you cut your length of line, double it in the middle and crease it. This will give you the location of the knot that you will make when tying it onto the cringle at the edge of the sail. See the sail plan for these. The lazyjacks will have to wait until the topsail is rigged.

The topsail is raised by taking the leading end of the line you spliced into the uppermost corner of the sail. Then put it through the block at the top of the mast. The leading end comes down to a pin in the rack on the shrouds on the port side.

The downhaul can be spliced into the outer end of the sail, (clew). They are then brought up through the single block tied to the peak and again down to a pin in the rack on the shrouds (port side). The outhaul leads from the clew, down through the pendant suspended under the gaff on the starboard side. It then leads to the pin rack on the shrouds on the starboard side.

If you previously spliced one end of the lazyjack into the eyebolt, in the trestletrees, and then coiled line, you will have part of the job done for rigging these. If not, you will need a long length of rigging line that will go down under the boom at the end. It then is brought back up again to the eyebolt on the opposite side of the trestletrees.

Take care when setting this line up. Too much tension on the line will raise the boom to an unnatural position. Now would be a good time to make the final adjustments to your other lines so that the boom rests easily in position.

Once you are sure of where the boom should rest, splice in the second line and secure it with a spot of glue. Then make the finishing touches on your rope coils on the pin racks. The lazyjacks are finished off in the same manner as those for the jib sail.

There still remains the boat tackles, flag halliards and pennant to set up. Even if you don't make a small boat to suspend from the davits, you might still want to rig the boat falls (Figure 126).

The block suspended from the fall is a single block with an iron strap and hook. This can be made from thin brass wire beginning with a small eye that is formed around a darning needle 1/32" in diameter. The wire is brought down around the block and twisted in the shape of a hook. The hook is lightly coated with solder and filed smooth, then painted black.

Light colored rigging line is spliced into the eye or becket of the block and brought up through the underside of the davit on the inboard sheave. Go back down through the block and back up through the outboard sheave to belay on the cleat located on the the upper side of the davit inboard. To get the blocks to fall naturally dampen the line then clip on some sma.

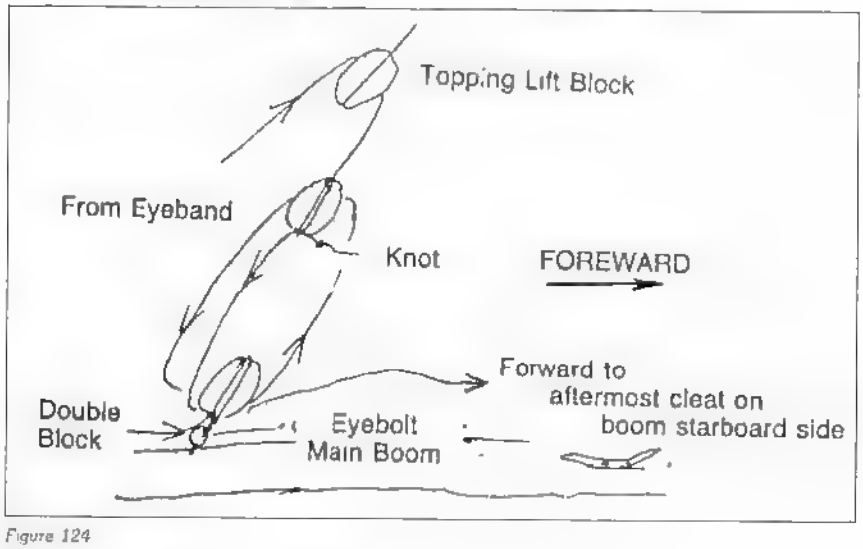


Figure 124

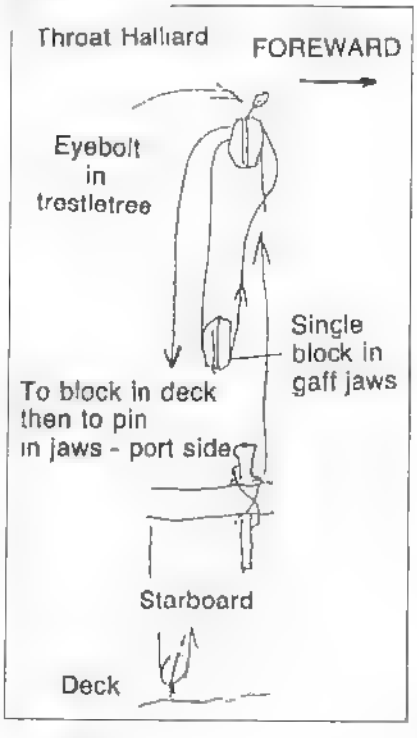


Figure 125. The Throat Halliard

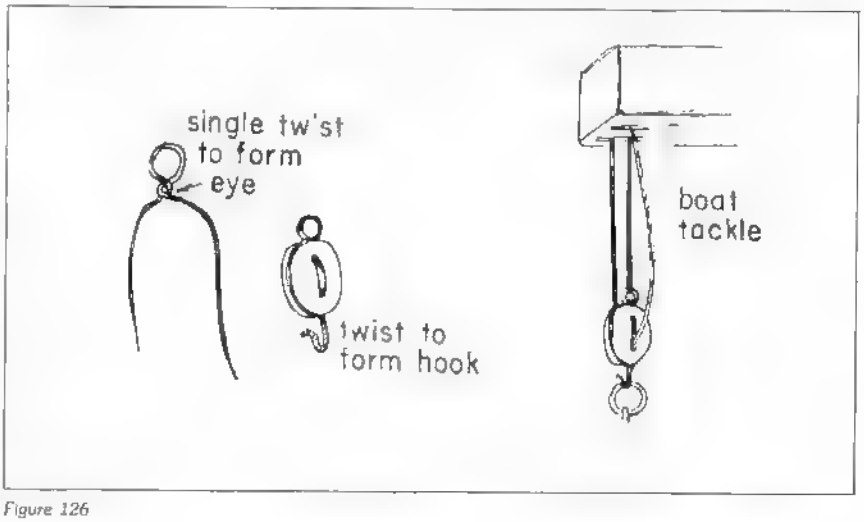


Figure 126

Photo 22 The Boat Hook Photo by George Ancona

1/2" diameter These are bored through the sphere to carry the halliard rope. It's a wonder such a small object was recovered after tumbling about in the sea! In practice the pennant was lashed to a short wooden staff. A rope and becket were seized at the ends of the staff then this assembly could be carried aloft by the halliard

Making the pennant is simple. The shape and design are drawn on the fabric taped to some stiff cardboard. The edges are trimmed after painting on the design Keep in mind that the design must be put on both sides but that the reverse must be traced as though the fabric were transparent Acrylic paint works well and is easy to handle. Just add a little liquid detergent to the water used to thin and clean your brushes for easy flowing of the paint

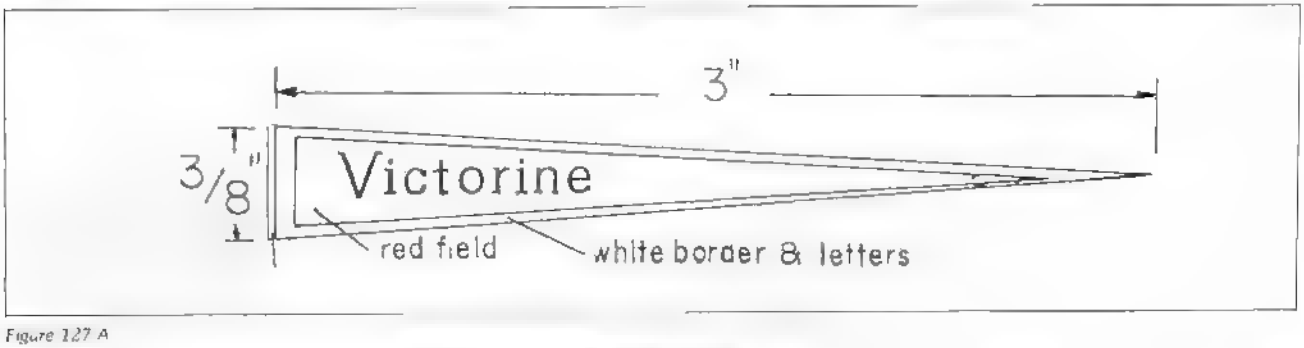


Figure 127 A

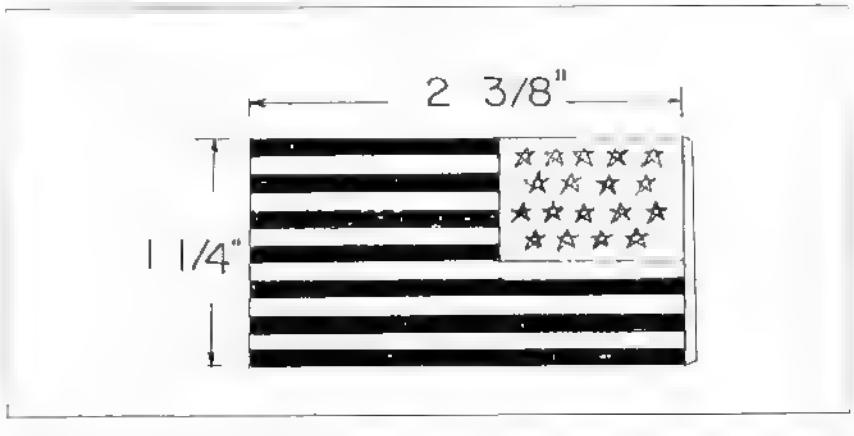


Figure 127 B

bulldog clamps to the hooks Allow the line to dry overnight before removing the clamps

The pennant and small American flag can be made from paper or fabric (Figure 127), whichever you are most comfortable with. I found a fine textured polyester taffeta with almost no grain and little sheen, but soft enough to fall nicely. It also takes acrylic paint very well. It comes in a beautiful red and can be found where fabrics are sold

The pennant for the VICTORINE follows the color scheme in the early painting of the Hudson River sloop that appeared in Chapter 16. It has a red field white border and lettering If you like, you can also add an American flag at the peak

The pennant fastens to the top of the topmast. A map pin is ideal for the purpose. A small tab is left on the inboard edge of the pennant so that it can be bent around the pin. These small pennants were actually hoisted to the masthead truck by means of halliards

I was shown one of these trucks by Matt Costa, whose hobby is collecting and preserving such artifacts in Provincetown Massachusetts (Figure 128 and Photos 23 A and 23 B) The small sphere is flattened on the bottom to sit on the shoulder of the masthead. A recess or socket is bored through the center about 2/3rds the diameter of the sphere. To one side, two holes are bored, side by side and about 3/4" apart, which measure about

Once you've completed both sides of the pennant it can be cut out leaving about 1/16" on the edge that will wrap around the pin. If you like, you can gild the head of the pin, but first give it an undercoat of paint so that the gold will adhere better You will have to nip off the lower end of the pin to get it to the correct height above the top of the mast Once that's right you can glue on the pennant and epoxy the pin into the top of the mast

The small American flag that flies from the peak of the gaff is set up on a halliard The foldover tab for that flag is glued to the halliard. You can either bore a small hole through the end of the gaff to carry the halliard or insert a small eyebolt into the end of the spar On my model, I bored

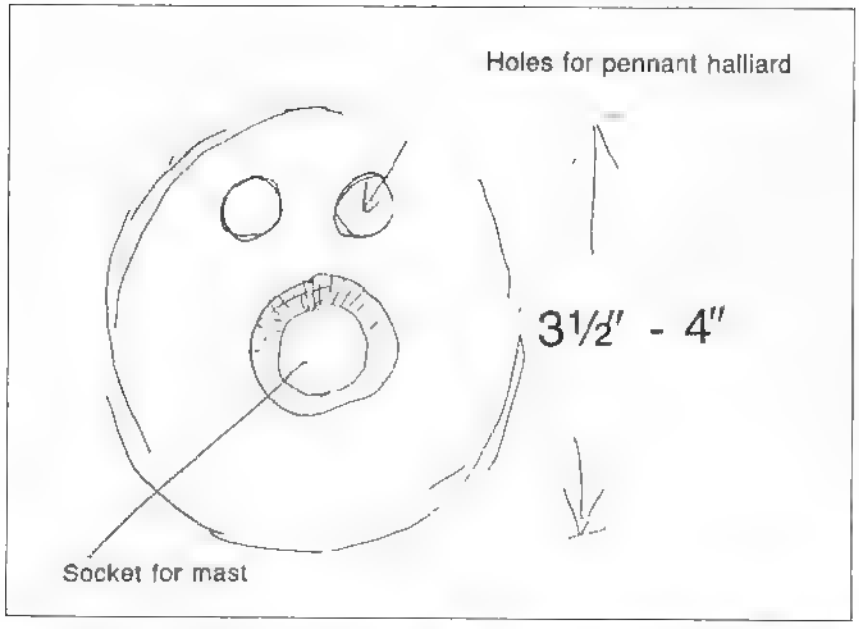


Figure 128

a hole through the end of the spar Painting the design on the flag is pretty straightforward, with the exception of the stars on the blue field. It's better to paint the blue background color in first, and when that's dry, then mark and paint in the stars. Use a single edge razor to cut out these small flags

Another trick to getting them to hang properly, is to pre-shape the folds by use of weights and matte finish acrylic spray Smooth jawed alligator clamps are good for this job. The area that will be touched by a clamp should be protected by a fold of lighweight card

The pennant's pin can be held in a vise while the weights are applied. The spray will dry in a few minutes You should give it a quick spray. It will darken the fabric but don't be alarmed, it will return to its natural color when dry. As soon as it does release the clamp. You don't want too much fold in the pennant. The flag has greater area and so it should be left to set he folds overnight. It would naturally hang limp from the peak of the gaff

While your flags are setting up you can return to the reef points on the main and jib sails. These should be touched with a spot of glue at the ends so that they hang in a vertical position You'll see that they have a tendency to curl and that has to be corrected. Make final adjustments to all your belaying points and where necessary touch with glue to hold them all in position

Install the flag halliard and bring the leading ends down to the innermost cleat on the starboard side Refer to the sail plan for the location. This halliard should have a slight curve to it If you've used lightweight rigging line it should drape nicely

One further inboard detail that can be added if you like is the boat hook. I mounted mine in the waist of the main deck above the scuppers on two short

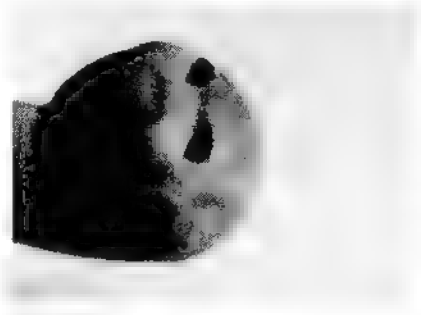


Photo 23 A

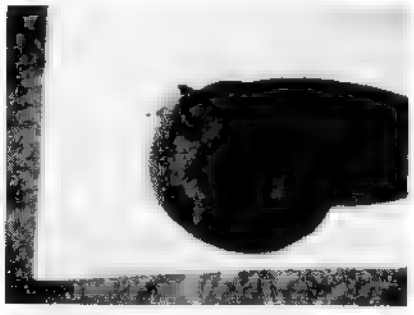


Photo 23 B Photos by Matt Costa

lengths of wire bent at right angles inserted into the timberheads The overall length of the boat hook is about three inches The hook portion is about 3/8" long (beyond the wooden handle)

It was made from 1/32" square brass stock (Photo 22). The brass was heated to a cherry red, then bent into the hook form and hammered nearly flat reheated and hammered again to make the point at the end of the hook The portion that is inserted into the handle must be filed down to the diameter of a pin forming a shoulder (Figure 129)

The pin portion should be about 1/8" long so that it will hold when inserted into the end of the handle The handle for the hook will only be just under 1/16" in diameter. Use some 5/64" square stock cut longer than needed so that you have something to hold onto while shaping the handle. In one end bore a hole for the pin of the hook. Try it until you get a good fit. Use a #74 drill bit and adjust the pin on the hook until you have a good fit Once you have epoxied the hook into the end of the handle then proceed to reduce the diameter of the handle to the diameter of the shoulder on the hook.

If you do the handle separately you will find that you will tend to round the upper portion where the hook is inserted making for a strange looking assembly. Once the handle is shaped properly you can cut off the lower end squarely with a razor blade The handle can be stained and the hook painted black, then hung on the wire hooks at the bulwark

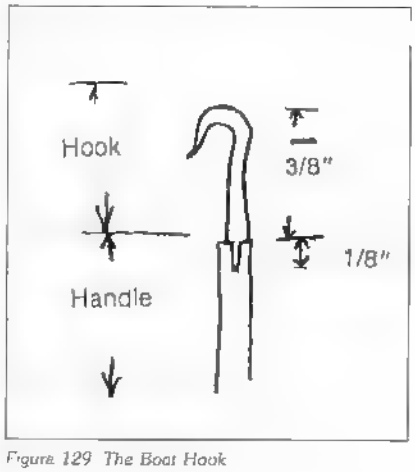
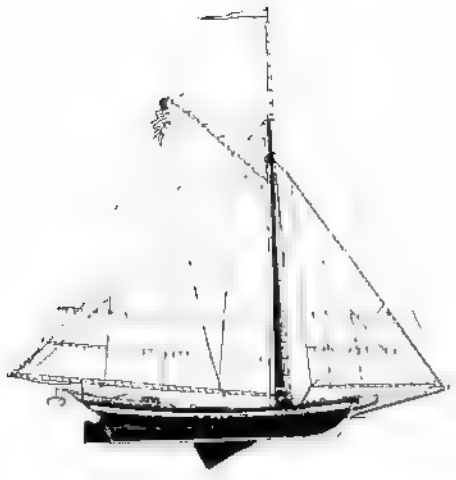


Figure 129 The Boat Hook



26

Final Details

When you have gotten far enough along in constructing the VICTORINE model, you will be thinking ahead to its mounting and display. Very little needs to be done now to complete this model so I urge all of you to take some time out to build the small boat at the stern.

It will add to the overall look of the model and it takes only a few hours to build. The lines are shown in Figure 130. It's constructed from a scrap of 1/2" thick pine the width of the boat, and strips of basswood.

Begin by making tracings of the profile and top view including the centerline. The bottom edge of your block will be the baseline for your little boat, not including the keel, as this is added later. Cut the length you'll need from the inside of the stem to the back of the stern. Rubber cement the profile tracing to the side of the block using the bottom of the block as a guide.

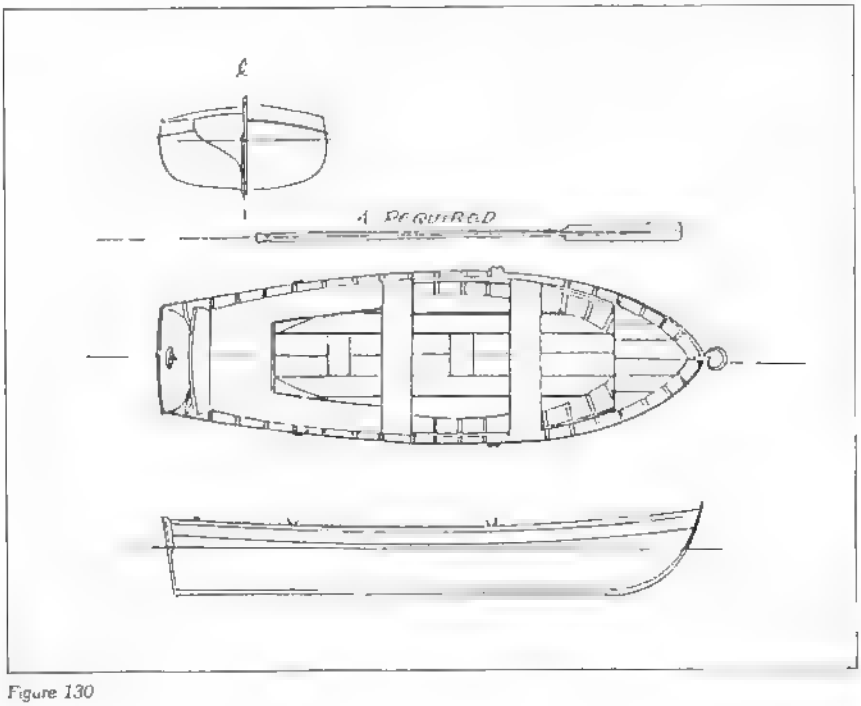


Figure 130

Cutting begins with the sheer line. This is the line just under the gunwale. If you use a small coping or jig saw, these two parallel lines can act as a saw guide. Cut this very carefully because you will be using the cut-off section again. After completing the first cut, rubber cement the cut-off section back into position on the top of the block. Draw a centerline down the length of the top portion, then rubber cement the top tracing onto the top, lining it up with the centerline and the ends of the boat.

Now cut the outline shape of the curve of the bow and angle of the stern while the block is still square. Follow by cutting the outline shape of the top tracing. You now have the rough beginnings of your small boat. Before you remove the top tracing score the centerline in with a #11 X-Acto blade. Continue the centerline down the sides and bottom of the hull. This will give you a reference point from which to shape the hull. Once that is done you can remove the top section and any excess remaining rubber cement.

Begin shaping the outside of the hull first at the bow and stern. You'll see by the plan of the boat that there is a small hollow under the transom. The stem has a slight "V" shape with a little hollow. A few passes with some fine sandpaper will create this hollow, so approach it easily. Try rolling some sandpaper around a 1/4" dowel to shape the stern hollow. You will want to preserve an edge down the centerline to mount the keel and stem. This edge should be about 1/32" wide. Try not to round the centerline over as you work. Better to leave it a little overwide, mount the keel and then remove the extra wood, than to take too much off at this stage.

Once you're satisfied with the outboard shape of your boat proceed with the inboard contours. From the plan, you see there is a short deck at the bow and two

Photo 24 *Photo by Gary Lilhen*

thwarts plus a stern seat. Bottom boards cover the small ribs. The boards are cut from 1/64" thick basswood and the ribs are cut from file folders or index cards.

The gunwale can also be cut from the paper stock. It will be painted so it won't show, and it will be far less likely to break. The thwarts and seat can be cut from basswood without worry.

The small boat is suspended from the boat davits by means of iron rings at the bow and stern. These rings are 1/16" inside diameter. Both are fitted to eyebolts made from fine brass wire. The keel and stem are cut from one narrow strip of heavy weight file card. File card dividers are good for this purpose. The rubbing strake on the outboard sides of the boat are also cut from this material.

The excess wood that has to be removed inboard can be done with a rotary ball cutter or small round gouge chisel, whichever is most comfortable for you. Prior to installing the frames you should give the whole area inboard a fine sanding. Keep holding the work up to the light so that you don't run the risk of working through the material of the hull. Pine is soft so it's removal will be swift.

The edge of the gun wale should be about 1/64" thick. Below this point you can leave more material if you wish. Once the interior is done you can install the ribs cut from card. Mark the location of the upper edge as a guide to placement. They cross the keel at right angles except at the bow. These are set at a slight angle. Follow the plans for their placement. Over the ribs, cut and glue down the bottom boards, then follow with the thwarts and seat. Lastly, glue on the back rest, after installing the iron ring.

Next, cut the rail that will cover the ends of the ribs. It will be about 1/16" wide down the sides and across the transom. Inboard the boat is painted a light grey. Outboard it is the same dark green as VICTORINE with a red rubbing strake. Paint this strake prior to gluing onto the side of the hull.

Small wire oarlocks can be made from black annealed binding wire bent to shape and inserted into the gunwale. Secure these with a touch of Crazy Glue.

The boat carries four small oars. These are lashed onto the thwarts inboard. They're made from 1/8" x 1/32" stripwood. Reduce the handle portion first to the size shown on the plans, then shape the blade. Wait until the model has been mounted on its permanent baseboard before installing the boat on the davits. At that time a touch of Crazy Glue will keep it from jumping off the small hooks on the blocks.

MAKING THE ANCHORS

You can purchase a small kedge anchor if you like but making one will give you the experience needed for future projects. They're fun to make and the end result is more pleasing to the eye. The

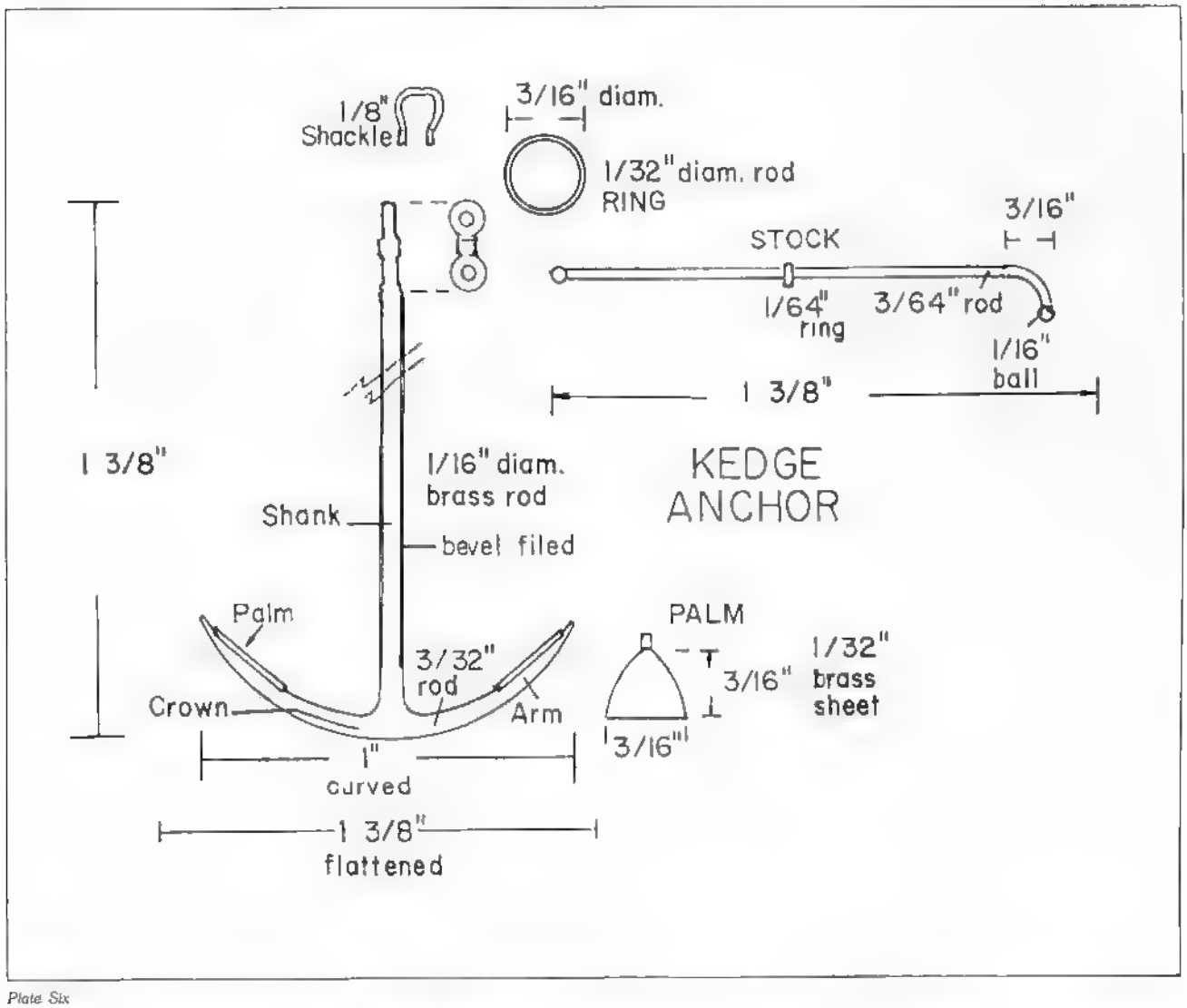


Plate Six

design and measurements for VICTORINE's anchors are shown in Plate Six.

The anchors are made from brass strip and rod available at most hobby supply houses. Soft silver solder is used to join the components. You will notice that the length of the crown, when flat, is greater than when it is curved to shape. So, it is the flat measurement that must be used to cut the length of this unit. Some of the areas to be worked will benefit from first being heated, while other areas should not. I'll point these out as I go along. The small shackle is made in the same manner as the shackle on the bobstay.

Work begins on the shank of the anchor by cutting the required length then scribing off the area for the pin at the lower end followed by the two ringed section for the shackle and stock. The pin must be filed first, before heating (Figure 131-A). This creates a shoulder for the crown to rest on and a pin to secure it to the shank for a strong joint.

Once the pin is made, heat the upper portion and scribe the location of the two holes. Use a 1/32" diameter nail punch to flatten the sections, first on one side, then on the other. The upper and lower holes are bored for a 3/64" diameter hole.

The crown section is next. This time cut your stock a little oversize. Mark the center and file a slight recess to fit the shank, then bore a 1/32" diameter hole for the pin at the centerline. All this is done while the crown section is still straight. Next, mark the correct straight length for the crown and trim down the ends. Mark the ends of the crown for the palms. These are recessed slightly into the arms of the crown at the ends. The stock should be clamped in a vise to be sure you have uniform depth of cut.

When finished, heat the whole length of the crown and allow to cool. Clamp the shank portion in the vice. Pre-tin the end of the pin lightly with silver solder then press on the crown portion. Enlarge the hole if necessary. Make sure that the crown is in the opposite direction of the holes for the stock of the anchor. Use annealed black wire to secure the crown to the shank for soldering (Figure 131-C).

Cut and shape the two palms from brass strip, then pre-tin one side of each. Remove the shank portion of the anchor from the vice and reverse it to now hold the crown section. This will act as a heat sink so that the joint will not loosen up while the palms are soldered on. Pre-tin the flattened areas, then position the palms and bind with the wire before heating with the iron. When the palms are secure remove the wire. Again reverse the crown in the vice. This time the excess material is filed away from the ends of the crown under the palms.

Lightly tap the end of one arm with a hammer to shape the curved portion — first one side, then the other, until the crown is created. The section under the palms is then filed down to create a point at the ends of the arms, then the under portion is slightly rounded, again by filing. Finally, the shank portion has a bevel filed on four sides as shown in Plate Six.

Use 1/32" rod to make the ring for the anchor. Slip it through the upper hole in the shank and solder closed. To make the stock, heat one end, then curve by

tapping with a hammer until it makes a 90° turn. Solder a small brass ball at the end (or a bead of solder)

Solder a ring at the center of the stock then slip it through the lower hole in the shank and solder on a second brass bead at the end. These beads can be obtained from small key ring chains. Make the small shackle and slip it onto the ring, then solder a lil pin onto the shackles ends, nip off and file smooth

One of the best ways to paint these anchors is to hang them from their shackles and spray paint them. Pactra makes a scale black spray which is excellent for these anchors Follow up with a light spray of matte finish and, when dry, the anchors can be installed on the model One of the anchors can be stowed at the bow while the other can be lashed to a timberhead

The anchor cable is about 1/32" in diameter The line you use should be washed to remove the sizing which will make it easier to coil

The anchor cable is bent to the shackle as shown in Figure 133. The cable is brought inboard through and down under, then around the top of the windlass barre Then bring it aft and coil it to one side

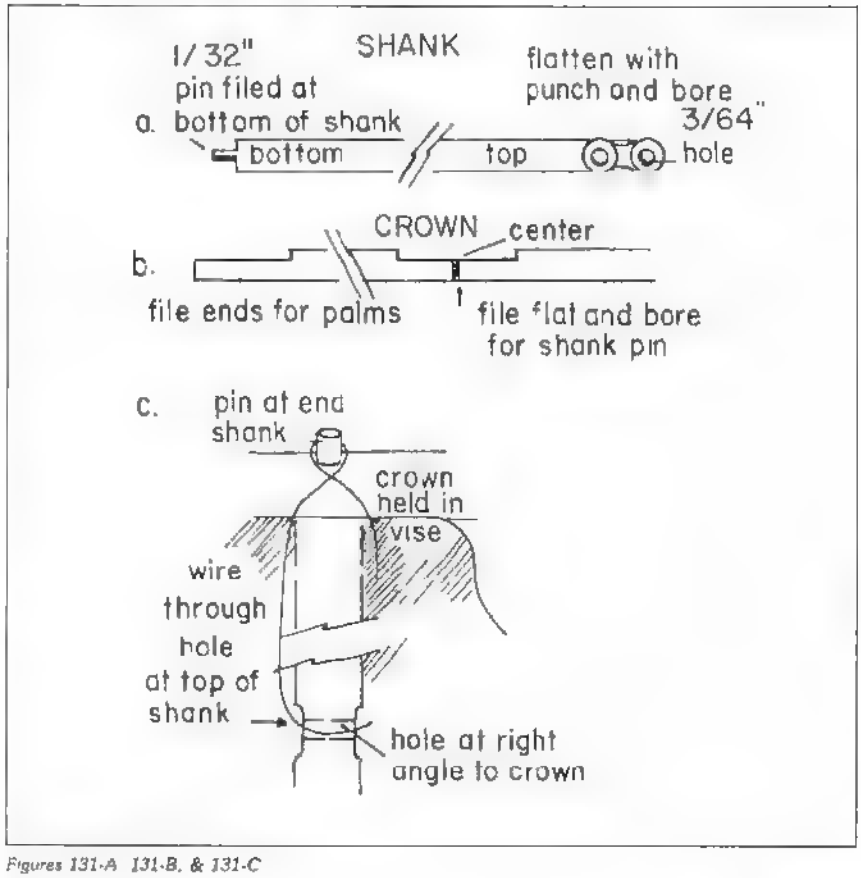
All that needs to be done now is to glue the centerboard to the bottom of the hull. How much of it you will have showing depends on the type of mounting used for your model

There are a number of options open to you for mounting the model. If you decide to show the full centerboard you'll need to have tall pedestals Raising the hull has the advantage of showing the subtle underbody lines of this sloop and for that reason the tall pedestal is ideal.

Commercial fixtures are on the heavy side when they're taller than 2¼". You might try using a smaller pedestal and adding some device to the bottom to get the height. You can do as I did and mount the keel on 3/16" square tubing

Earlier you bored holes for mounting pins in the bottom of the keel. Mine were 1/16" in diameter bored to take the same diameter brass rod. I used successively smaller telescoping square tubing down to 1/16" for the pedestals. The 1/16" rod was cut long enough to be inserted into the hull and into the baseboard to a depth of 5/8". The rod was epoxied into the baseboard followed by slipping on the square tubing The protruding end of the rod was coated with epoxy, then the keel was gently pushed down into position and the excess glue wiped off. The distance between the baseboard and the bottom of the keel provided ample room to install the centerboard, and finally to put the model into its case

I close these chapters on the VICTORINE with a photograph of models done by two of my former students from the first class on VICTORINE (Photo 24 in the hope that it might encourage those of you doing your first scratch-built model



Figures 131-A 131-B, & 131-C

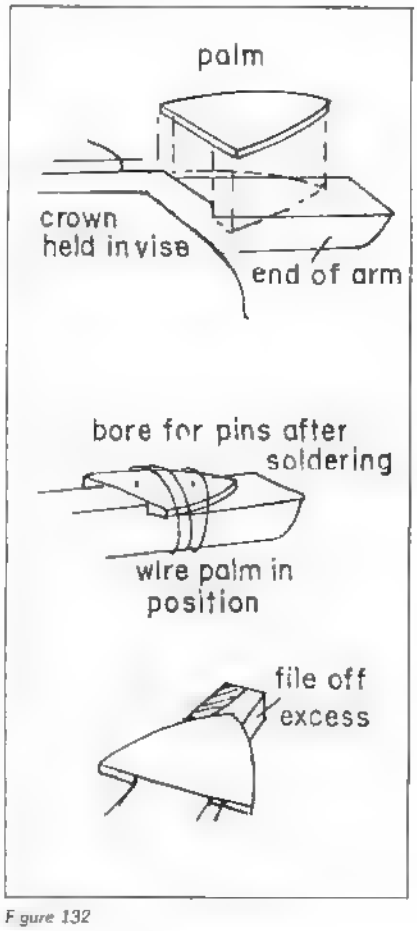
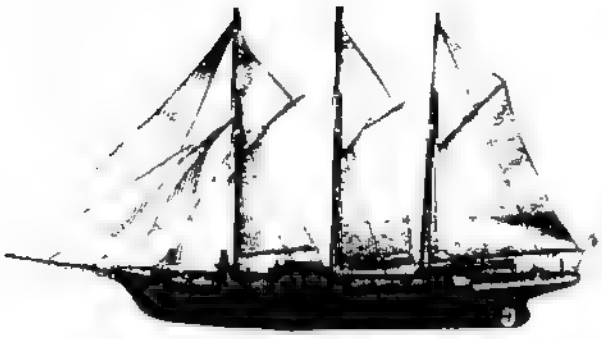


Figure 132

Figure 133.



"The Schooner Yacht Vema"

27

The Research Vessel Vema

In 1977, I was asked by the director of the Lamont-Doherty Geological Observatory to build a model of the VEMA which Columbia University owned and operated as an oceanographic research vessel. It was requested that the model be built as VEMA appeared when she was chartered for her first cruise in 1953, under the late Dr. Maurice Ewing. At that time, she retained a large portion of her former rig as a schooner yacht, all of her deck furniture, and ground tackle.

Since then, VEMA has undergone dozens of refits which totally altered her original appearance with the exception of her iron hull which is reminiscent of some of the large fishing schooners in the northeastern United States.

The Marine Department at the Observatory maintained a large picture collection of the vessel dating from the original owner up to the commission of the model which was helpful in the construction of the deck details. They also possessed a copy of the original builder's profile, sail, rigging, and deck plans designed by Cox and Stevens and built in 1922 by Burmeister & Wain at Copenhagen, Denmark.

This drawing also provided section drawings of the hull at each of the three masts, station lines on the hull profile with offsets at each waterline, and detail drawings of the deck furniture. A later drawing, showing five additional sections, and the original were used to reconstruct the lines for the model.

It was not until the hull was completed that two more drawings came to light. The first was a body plan which matched the Burmeister & Wain profile, while a second profile drawing differed both at the entrance to the bows and at the opening for the propeller shaft. It's possible that this

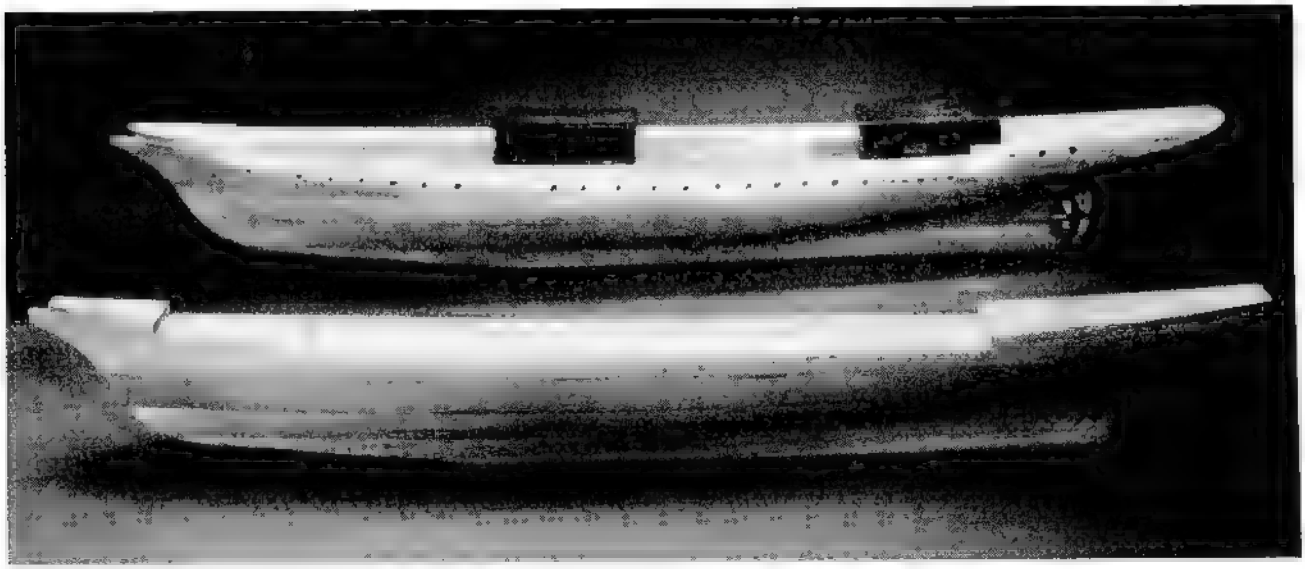


Photo 1. Two hull profiles of the VEMA. The upper hull has the ports bored and the prop in position. The lower hull will be completed at later. It was presented to the Captain of the VEMA upon his retirement. Note that the after cabin steps up onto the quarterdeck.

Photo by George Antonio

might have been a preliminary drawing, or that it represented the hull of the second HUSSAR built a few years later. The lines shown here in Plates 1 and 2 are those used to build the model of VEMA.

This schooner yacht was originally built for the financier E.F. Hutton in 1922. Three years later she was sold to the shipping magnate Ungger Vetlesen. He changed her name from HUSSAR to VEMA, a combination of the first two letters of his surname and that of his wife, Maud. Vetlesen retained the vessel until the beginning of World War II when this, and all other large yachts were taken over by the government for Coast Guard use in patrolling coastal waters of the U.S. Later, VEMA became a barracks and training vessel for the Merchant Marine Academy at Kings Point, Long Island.

After the war, she lay abandoned at Staten Island until salvaged for a charter vessel. By now the elegant appointments that once graced her interiors were a thing of the past.

VEMA was chartered by Columbia University for its first oceanographic expedition in 1953, then later purchased as the University's first research vessel. In January 1976 she logged her millionth mile. Finally, she was retired as a research vessel and sold in 1981 to a Florida based cruise line which has since restored her to her original yacht configuration. Looking much as she did in 1922, VEMA now sails the Caribbean.

The hull was constructed of cherry wood and built on the lift method (Photo 1). While this is not my favorite method of building a model, it was the most expedient at the time.

The hull was shaped in the usual manner with the use of templates. VEMA was carved without the bulwarks in order to make the job of laying the deck an easier task. The area between the quarterdeck and fo'c's'le at the sides of the hull were rabbeted to receive an S-shaped bulwark section much like that used in the VICTOR NE model. Spacing for both the bulwark stanchions and the deck planking were gleaned from photographs in the VEMA collection. A photograph of the fo'c's'le indicated 60 planks in that area up to the waterways. Basswood strips, 1/32" wide, were laid in continuous lengths rather than butting the joints, because at that size they would have appeared more like specks of dust than joints between planks. The places occupied by the large deck houses were left unplanked to facilitate their subsequent installation.

Before the bulwark was installed, all of the deck fittings were marked on the surface of the planking. Holes were bored for the pipe ventilators, smoke stacks, and boat davits, followed by those required along the side of the hull for the port holes, hawse holes, and propeller shaft. All this was done in preparation for painting the hull which, by the way, became a nightmarish operation.

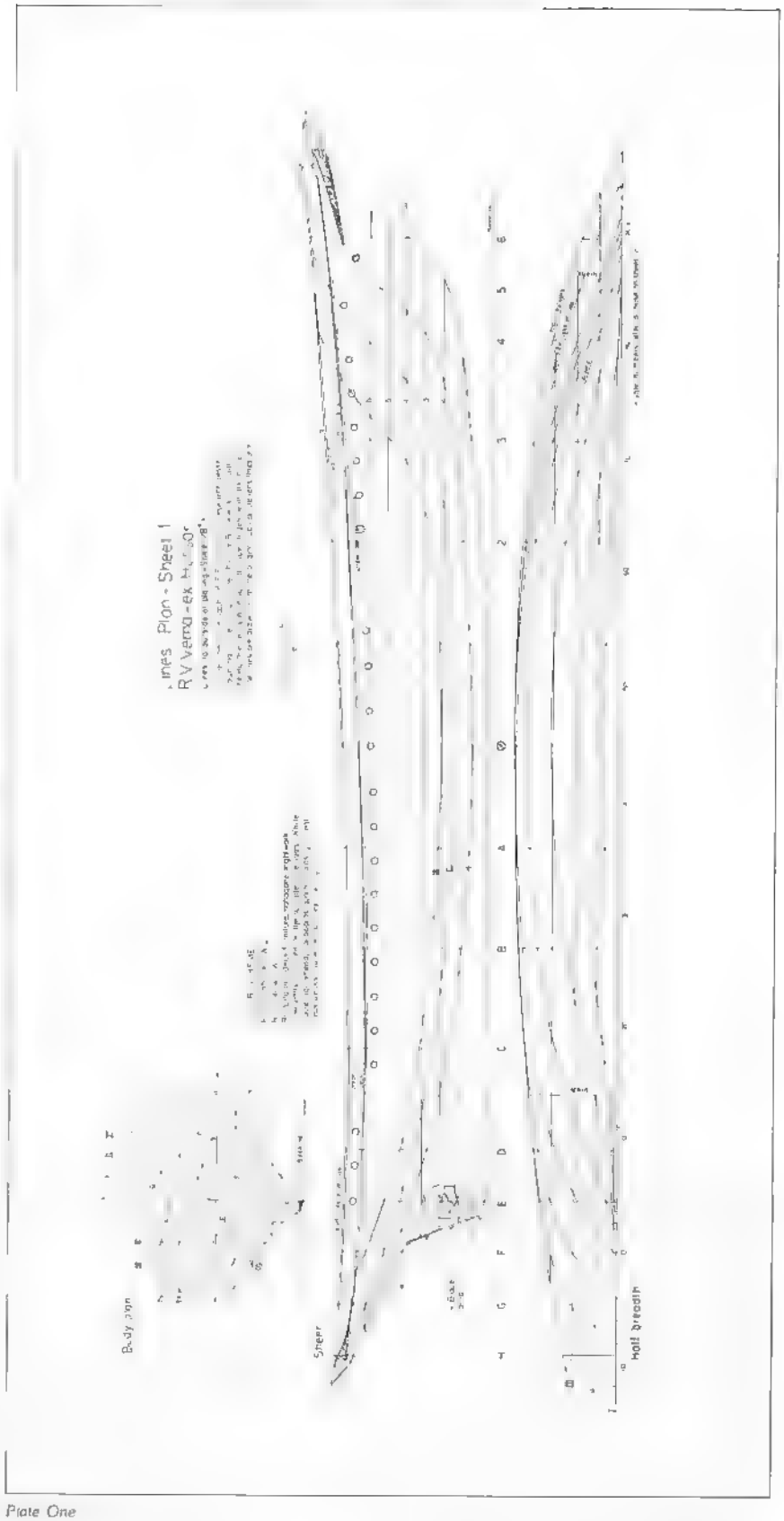


Plate One

Painting began in early January during one of the worst freezes in New York's history. My workshop was intensely cold due to an inadequate heating system, but I ploughed ahead without a thought to the trouble that lay ahead. The topsides were masked and spray painted black, then

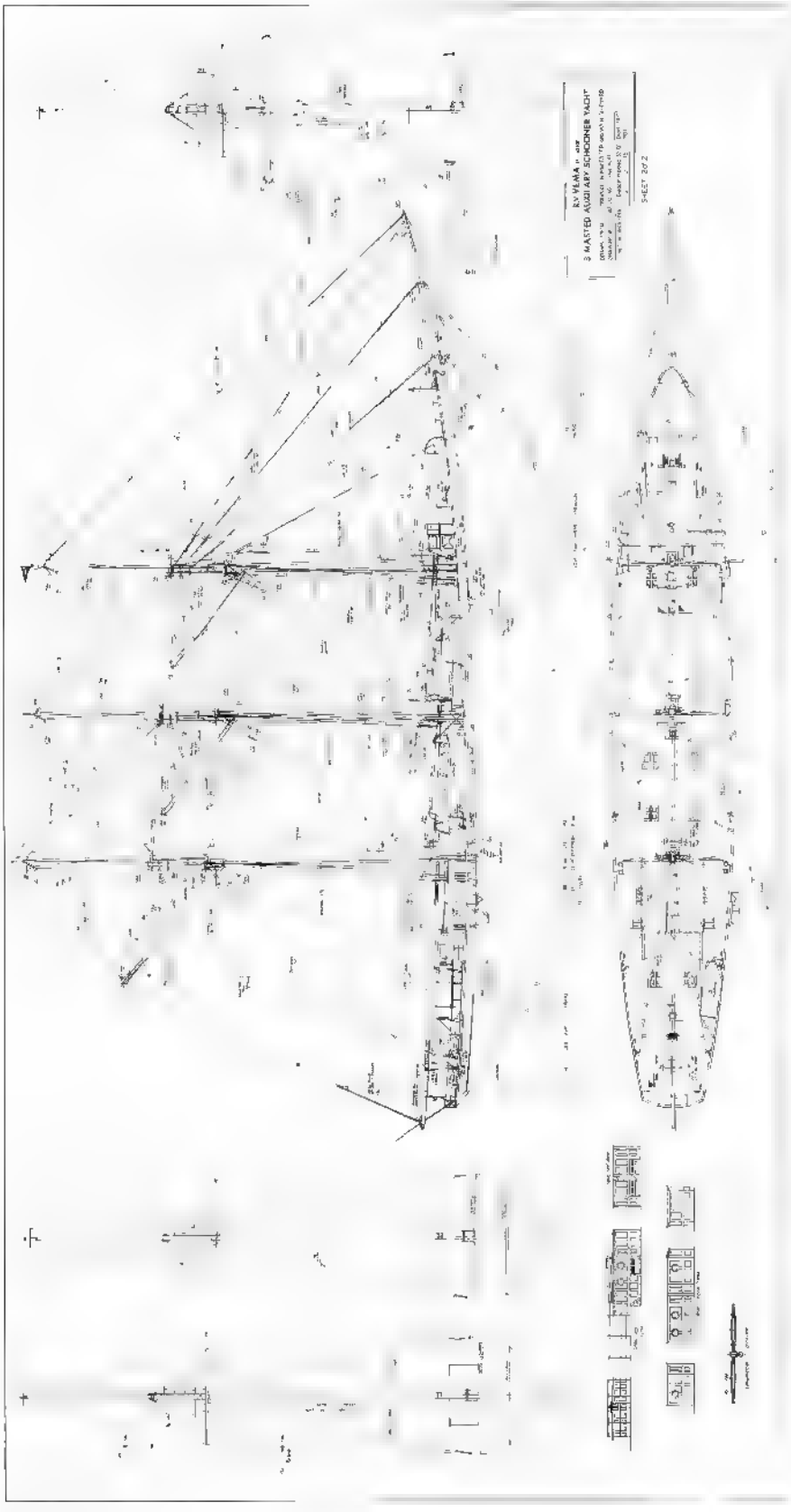


Plate Two

given a coat of clear in readiness for the red bottom paint. Two weeks later, the black area was masked out and the first coat of red bottom paint was applied.

After waiting for another two weeks, I was about to apply the second coat of red only to find that the first coat had not dried under the surface film. It was then I realized that the acrylic paint had been affected by the extreme cold in the shop. This meant that I would have to strip off all the paint and begin again.

My second attempt showed the bottom paint definitely streaking despite my having strained the paint through a stocking. In desperation, I decided to brush the paint on in a most unorthodox manner, using a large two inch sable brush. The paint was mixed in a large shallow bowl and kept in motion between applications to the hull. This time, it dried to a smooth eggshell finish and I could once again breathe easily.

Between the frustration of these painting sessions, work had begun on some of the deck furnishings and details. The Burmeister & Wain drawing provided side and deck elevations of the large deck houses while the photographs provided information on the details of the panels and mouldings that were used (Photos 1 and 2).

The deck houses were built over a solid core of pine with walnut veneer used for the panels, doors, and mouldings. The port holes for the hull and deck houses were turned up on the Unimat from brass rod. Their outboard faces would be painted black on the side of the hull and stained walnut on the deck houses. Providing these ports with glass was the next hurdle.

I finally chose to use 1/8" diameter plastic rod. A 4" length was chucked into the lathe which was set at a slow speed. After some experimentation, I found the ends could be polished to a high gloss by using a scrap of old T-shirt which I stretched between my fingers and held gently against the tip. If too much pressure is applied, the rod has a tendency to melt from the friction, while a gentle touch gives a bright polish. Cut off was done with the #11 X-Acto blade. (Let me add that I cut many extras because these small, almost invisible parts have a way of disappearing.)

The ports could be tapped into the side of the hull and into the deck houses with the side of a dowel (this prevents damage to the paintwork and mouldings) followed by insertion of the plastic rod. The completed deck houses shown here are without the framework required for the awning assembly that was built later on. The after deck house steps up onto the quarterdeck. A brass handrail extends from the small ventilation hatch at the middle of the cabin at the level of the cross brace moulding to the last upright moulding at the quarter deck level.

Brackets to hold this railing were turned from 1/32" rod after holes were bored for the rail wire.

Next, I tackled some of the ironwork structures for the deck and masts. At one time both square and rectangular brass stock was readily available. Today, it is all but extinct. The mast spreaders on VEMA would require considerable lengths of this

stock for their construction. Fortunately, a friend was able to locate some for me at a model railroad supply house. Both the spreaders and the caps for the masts required 3/64" x 1/32" rectangular stock.

Construction of the spreaders began as seen in Photo 3. The central portion which surrounds the mast was soldered first while held in a vise and using low silver solder (Tix). Banding wire was used to hold the two sections together and, although it meant wasting some precious stock, one of the outboard ends was bent back at right angles, forcing the central portion together during the soldering process. Because of the multiple joints involved, pre-tinning is an absolute must in almost all of the soldering operations unless you are skilled in the art of true silver soldering. Even then, it still should be a requirement.

After the central portion is complete spacers are soldered between it and the outer end. The right-angled portion is then cut away and the two ends pinched together around a brass eyebolt.

The unit can then be bored for the eyebolts that will carry the shrouds. There is stress in this area so it pays to solder these eyebolts as well. Banding wire is again applied to the central and outbaord ends to keep the joints from opening up with the reapplication of heat, afterwhich they can be cleaned up and spray painted with their first coat. Lemon wood was used for the construction of the masts because of its strength. Maple would do just as well, however.

There are multiple fittings at the mast doublings (Photo 4) that require some boring through; therefore, a hardwood mast will stand up better than a pine one. These were stained a dark pine and also painted white at the doubling and the topmasthead.

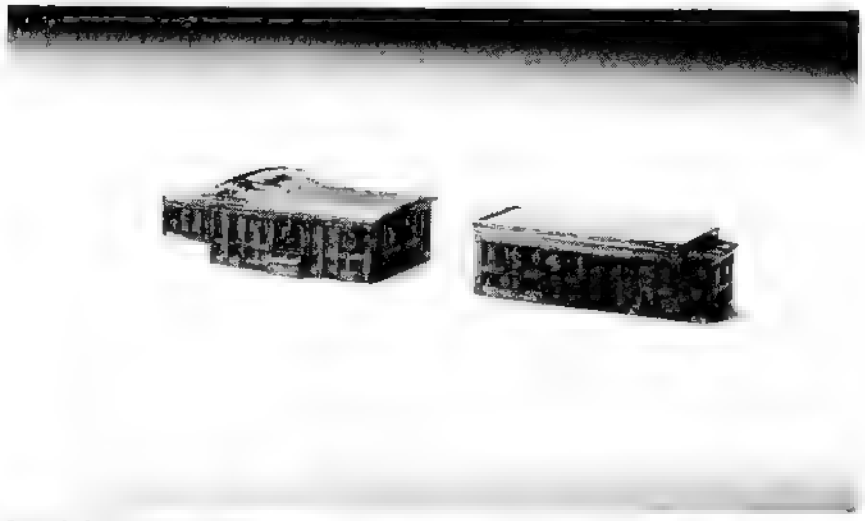


Photo 2. The completed deck houses. Photos by George Ancona

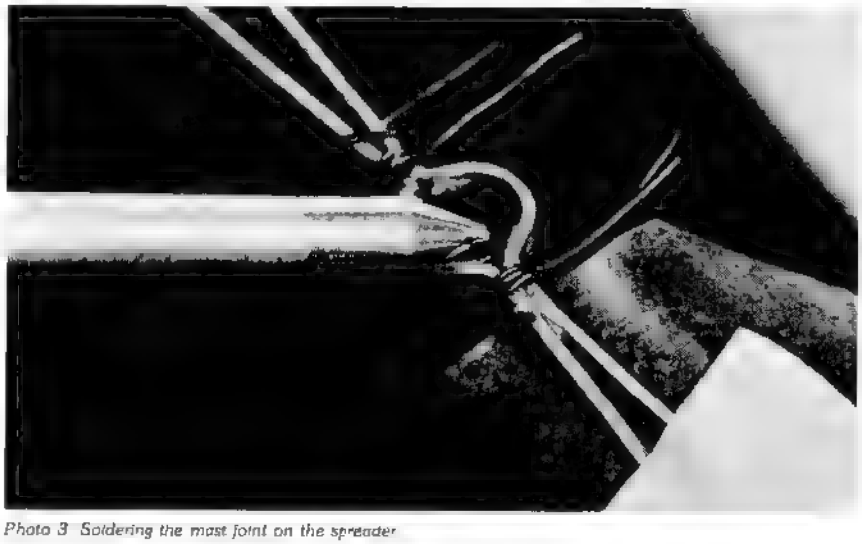


Photo 3. Soldering the mast joint on the spreader.

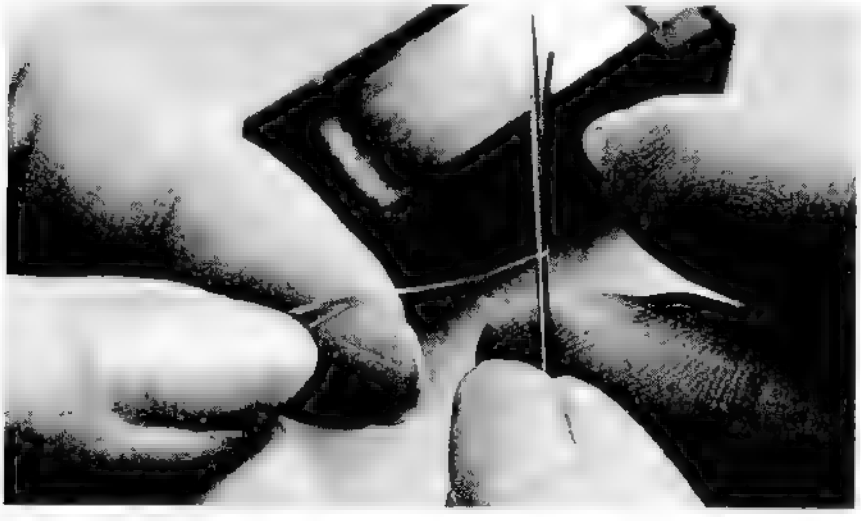


Photo 5. Twisting up rope from fine copper magnet wire using a large darning needle.

A similar soldering problem was presented by the bridge. It carries an 8-spoke wheel, a searchlight, running lights, and binnacle. These were all turned brass and were relatively heavy. Therefore, I decided to make the platform of 1/32" thick brass. The framework for the bridge was constructed from 1/32" diameter brass rod.

A tracing was made for the platform indicating the position for all the holes that would have to be bored for the upright supports and the railing stanchions. This tracing was glued to the platform prior to cutting and drilling for the holes. With these operations complete, the paper was

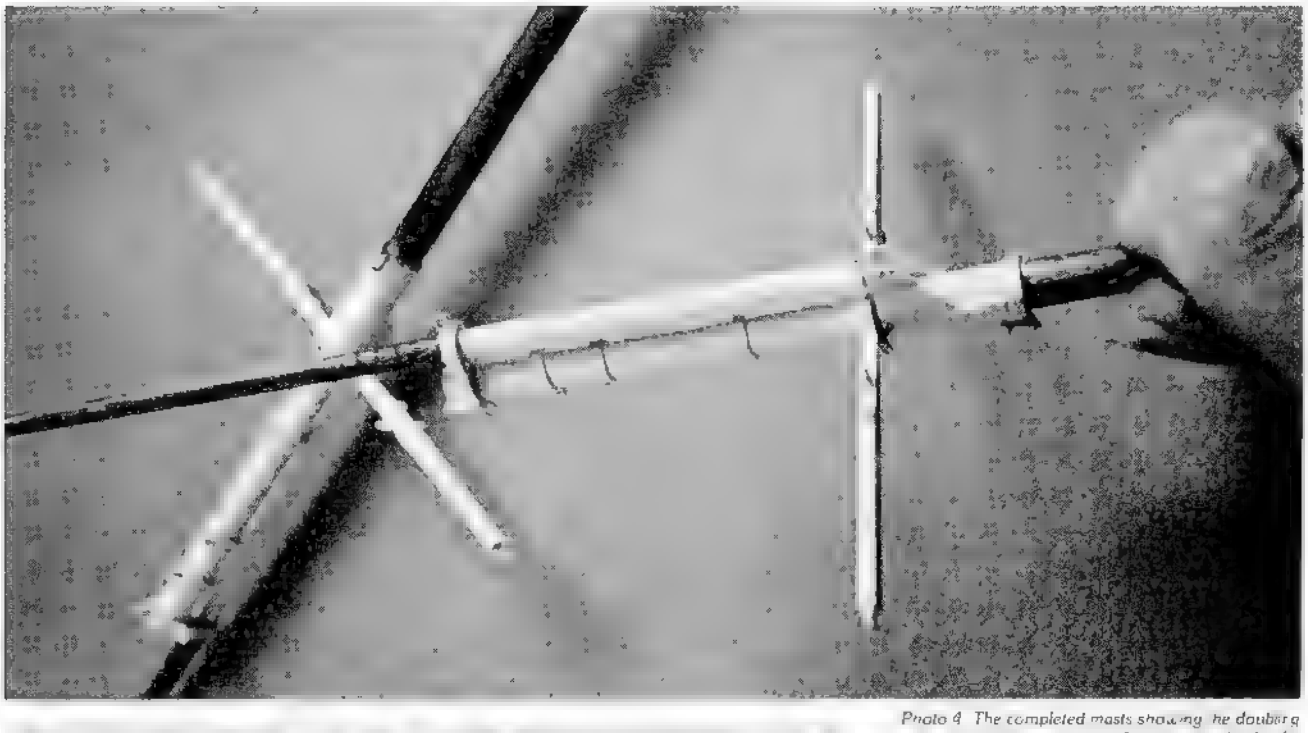


Photo 4 The completed masts showing the doubling at the masthead and hounds. Note the bracket for the gaff on the after side of the mast in the background.
Photos by George Ancona

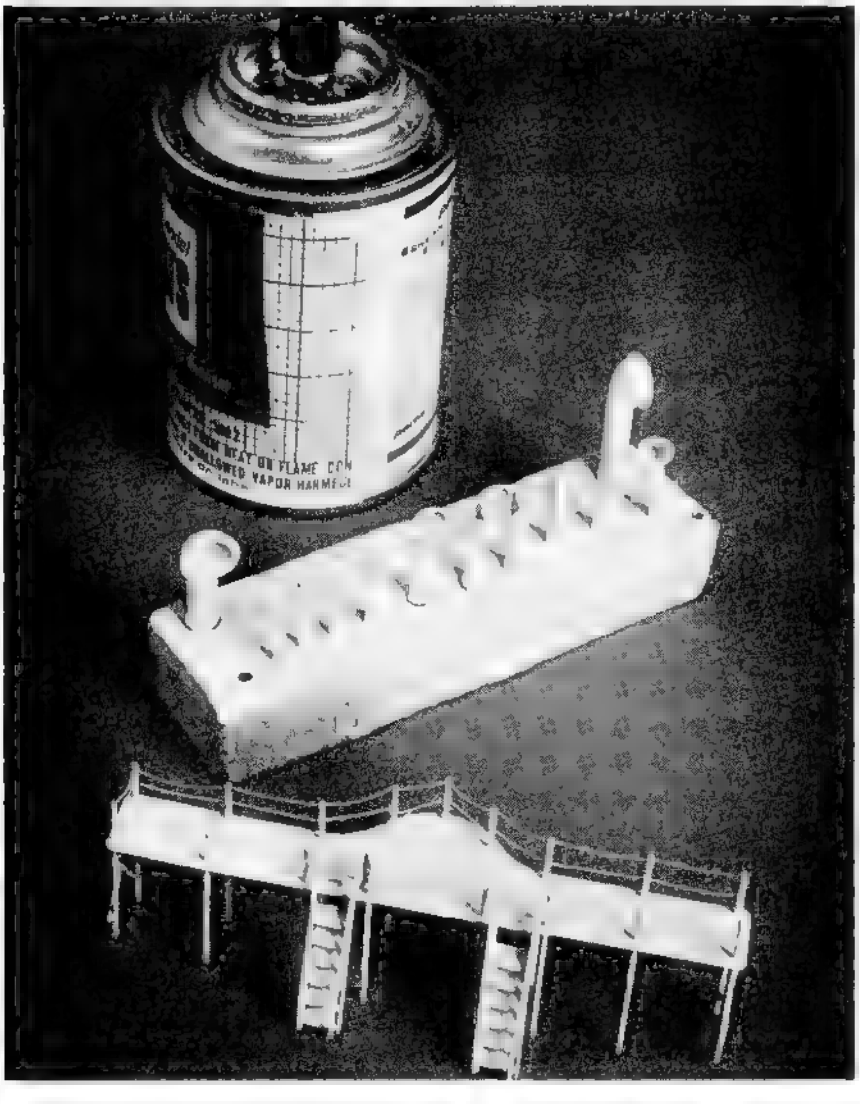
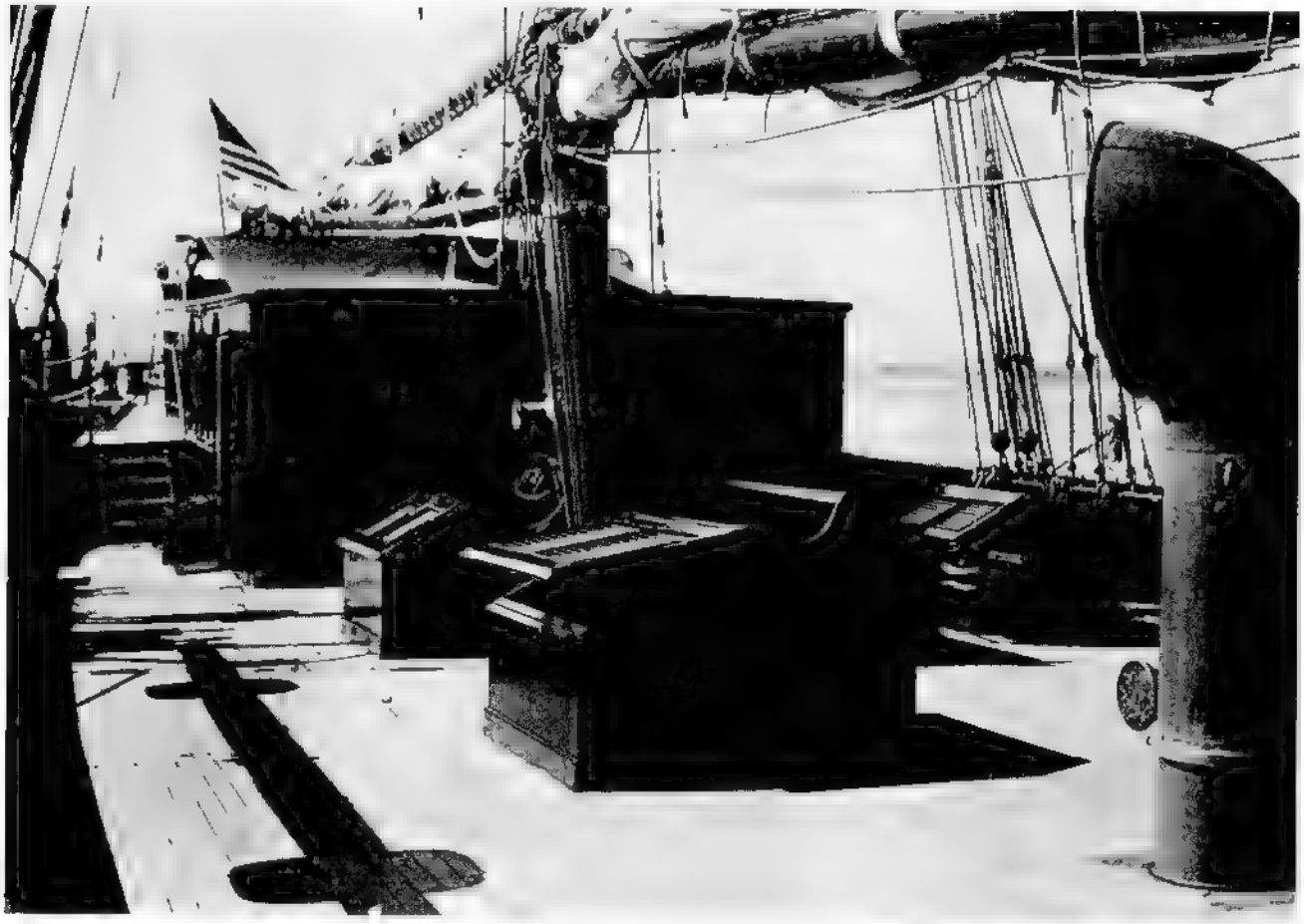
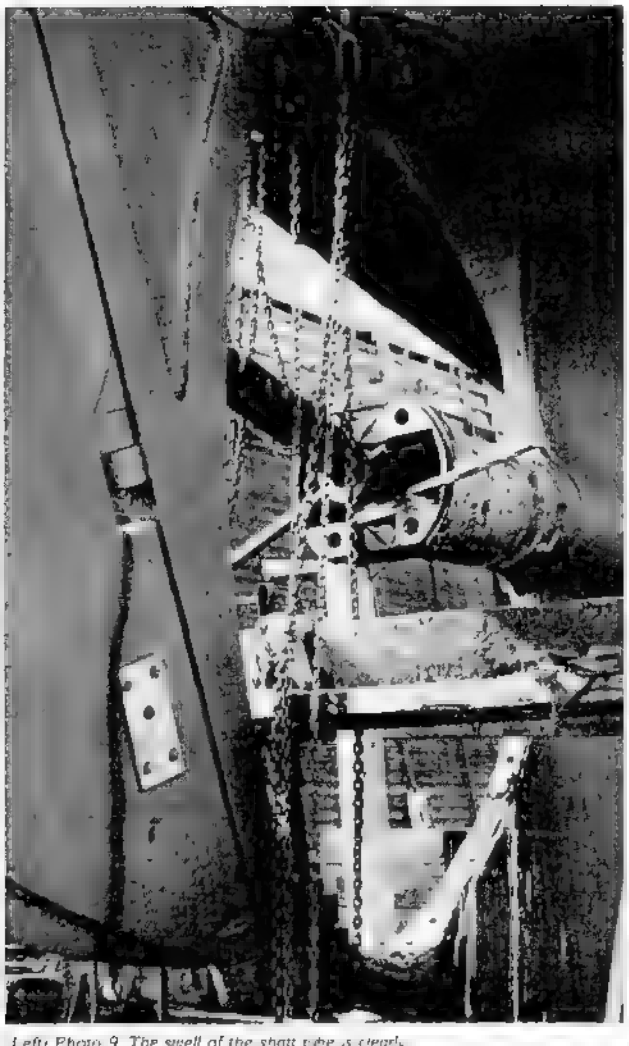


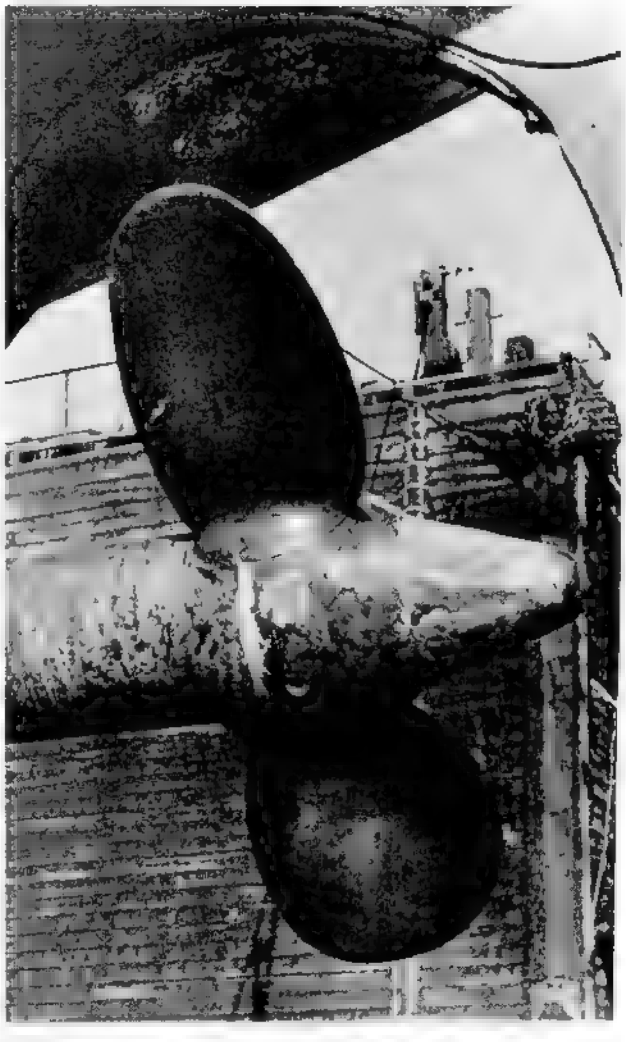
Photo 6 Pipe separators are inserted in masting, ready for spreader positioning in the foreground is the completed framework of the bridge.



(Above) Photo 7. A view of the main deck showing the ventilation hatches, bench, pipe ventilator, railing, a life boat, the cabin, and the gangways to the quarterdeck. Also note the mast crutch.
Photos courtesy of Lamont Doherty Geological Observatory of Columbia University.

(Below) Photo 8. A view of the forecastle. Note the nibbing of the deck planking into the margin plank. The anchor and its bracket are seen in the lower right. You can also see the anchor davits and footropes at the bowsprit.





Left: Photo 9. The swell of the shaft tube is clearly visible in this photo. Note the fore and aft centerline above the shaft and the rudder details in the foreground.

Right: Photo 10. A four-blade propeller with two blades missing (note the keyway). The propeller nears the top and both sides of the opening.

Photo 11. The figurehead for the VEMA before it was moved to the Geoscience Building at Lamont Observatory.
All photos Courtesy of Lamont Doherty Geological Observatory of Columbia University.

washed off and the pieces sanded before pre-tinning the holes. Some of the support brackets were bent to form a portion of the cross bracing and these served to support the underside of the platform.

On the afterside of the bridge there are two brass ladders, port and starboard, that carry railings down to the deck. These, too, were made a part of the upper ends of the support brackets, which themselves formed some of the stanchions for the railing that surrounded the bridge on top. Those brackets that penetrated the platform were scored so that their position could be accurately placed prior to soldering. These areas were also pre-tinned.

One end of the platform was clamped in the vise at one corner, the uprights inserted, and then heat was applied to the

Photo 13 Making model sails. Note the bolt rope on the turned down edge *By George Ancona*

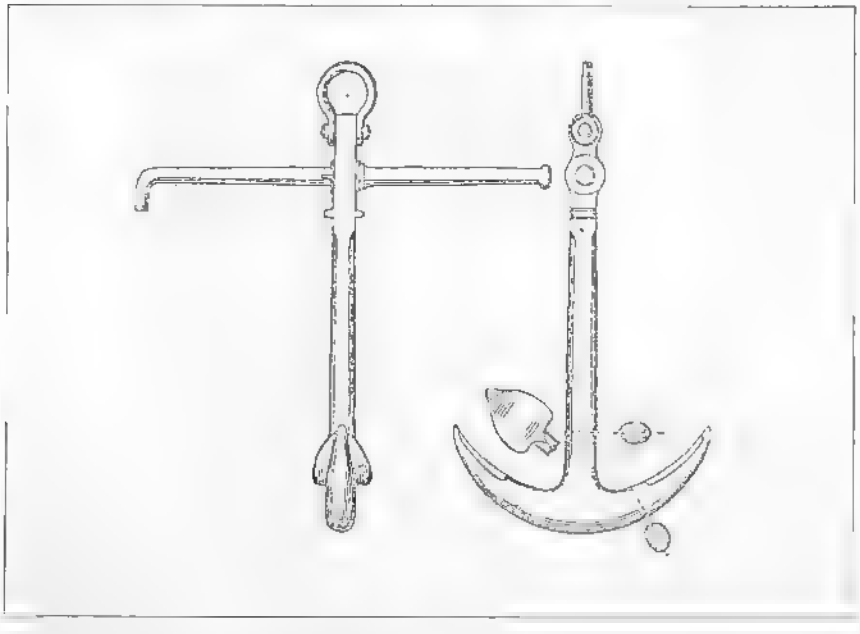


Figure 1

whole of the platform until the solder began to run. Only three-quarters could be done at one pass before the assembly had to be uncamped and reversed to work the other side. Ticklish work at best because now the stanchions for the rails had to be soldered in, using the same back and-forth method.

There is a narrow railing which surrounds the bridge. I found some 1/64" thick plywood used for model airplanes that was ideal for the purpose. Finding the location for the holes was done by inverting the platform and pressing it into some modeling clay with an even pressure. A strip of tracing paper was then applied and the location for the holes in the rail transferred to the tracing and then removed. A second tracing was made for the railing that would be rubber cemented to the plywood stock and cut out.

The final step for the bridge was to solder on the ladders and apply the fine wire rope prior to spray painting. Ultra thin copper magnet wire, twisted to resemble rope was used (Photo 5), then soldered to the stanchions prior to the painting (Photo 6).

There are multiple small ventilation hatches on the main and quarterdeck which presented something of a problem. All of them had brass rod guards that had to be simulated. Wire could be used for the larger ones, but for the smaller hatches wire just couldn't be seen. I finally decided to ink in lines to represent them. An excellent view of these hatches is seen in Photo 7. Size comparison is possible between the small one at the deckhouse side and those in the foreground of the photograph.

The anchors and davits (Photo 8) are simple enough to construct. The anchor (Figure 1) is constructed from round brass stock filed to an oval shape as indicated on the drawing. Iron brackets hold it to the top of the rail near the fo'c's'le. The davit fits into the deck of the fo'c's'le. Note the

Photo 12 The VEMA at drydock at Kiel in the 1930's Note the figurehead and anchor chain. Note too the telegraph wires at the tops of the masts the boat davits and the framework for the bridge
Courtesy of Lamont-Doherty Geological Observatory of Columbia University

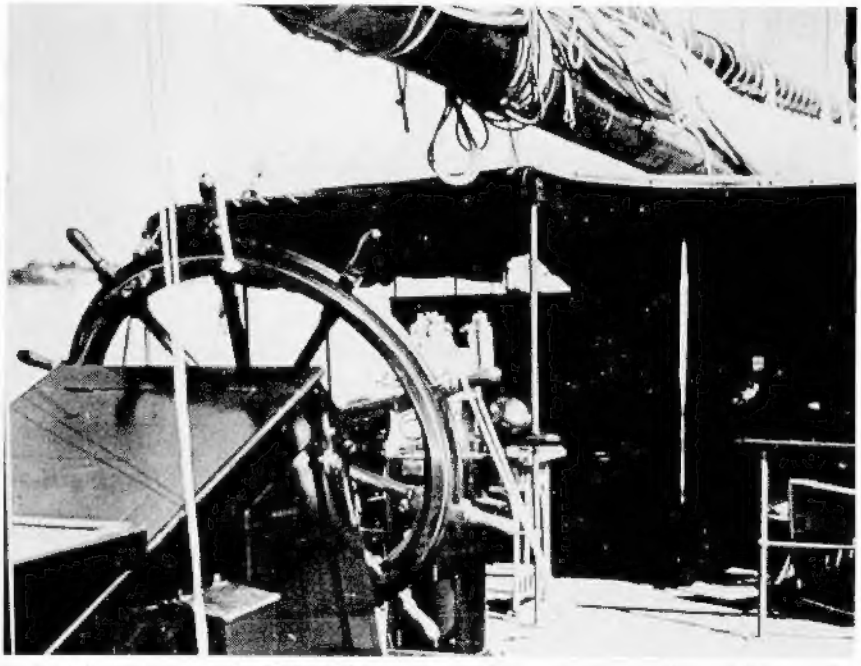


Photo 14. The stern area of the VEMA showing the supports for the awning, the 10-spoke wheel and wheel box. You can see the binnacle behind the wheel box.
Courtesy of Lamont-Doherty Geological Observatory of Columbia University.

cleat and eyebolts for the davit guys at the top. The method of construction is the same as that used for the VICTORINE model.

The last big metal-working job was to turn the hub for the propeller and to cut and solder its blades. The opening for the propeller is clearly shown in Photo 9, and the propeller, itself, in Photo 10. It is a four-blade prop, and in this photo two of the blades have been removed. You can see how the lower end of the blade conforms to the cupped shape on the hub. I felt it was best to slit the cupped section of the hub and then to insert the pre-cut blade prior to soldering and then twisting to shape. The hub itself was turned up in the lathe with a pin at its inboard end that could be inserted into the hull and glued with an epoxy. This was done first and then the outer end shaped.

After polishing, the propeller was given a coat of lacquer and set aside with the other deck fittings that would, for the most part, all go in after the rigging.

Before the masts could be installed or any of the deck fittings put in, the figurehead, trailboards, and quarterboards all had to be carved and gilded. The eagle figurehead of the VEMA had, for years, been outside the Oceanography Building at Lamont (Photo 11). A portion of the scrollwork of the trailboard is visable in the photograph. It was this photo, along with a photo of the vessel in drydock at Kiel (Photo 12), that provided the research material for the carvings of these fittings. Photo 12 also provided the source material for the awning frame of the bridge as well as the rigging of her spars.

The carvings of firethorn were all gold-leafed as were the originals, with some back highlighting in the trailboards. When these were completed, the hull was removed from the building board, inverted for their installation on the hull which was then mounted on its permanent base board. The mahogany that was used for the board came from a packing case from one of the Pacific Islands and, after finishing, it provided a beautiful base for the model.

The next big job was making VEMA's sails using fine drafting linen. Gores were sewn in with fine silk thread using a 3-0 stitch (Photo 13). The method used was the same as that used for VICTORINE's sails. A heavier weight silk was used when sewing in the bolt rope surrounding the sails. Before setting up the sails on the masts, the mast hoops had to be installed and a large portion of the standing rigging set up on the masts, blocks set up on the deck and sails and masts along with some of the running rigging. All the sails, with the exception of the one square sail carried on the foremast, were fore and aft sails. The photograph taken during her sea trials shows this spar bare, indicating that it was only used occasionally and so I left it bare as well.

The progression of rigging was done in much the same fashion as that for the VICTORINE. I prefer to set up as much as possible on the masts prior to installing them on the model, with the excess coiled up out of the way until needed. For me, it saves time and frustration even if it does appear as a hopeless tangle in the process.

Completing the deck fittings meant setting up the framework for the awnings at the stern (Photo 14) and cutting the awning for that area and the bridge. I used a fine cotton lawn as a base and painted it with traditional royal blue acrylic paint. After it was dry, paper patterns were made, rubber-cemented to the underside, and cut out with a single edge razor blade. The ten-spoke wheel and wheel box also seen in the photograph of the stern were made up at the time the smaller one for the bridge was constructed.

The last project was making the five small lifeboats and launches which would hang from the ship's davits. Basically, all of them were carved from pine. The upper works of the launches were constructed from the same thin plywood used for the railing of the bridge. All the boats were painted white on their bottoms. The area above the waterline on the launches was painted mahogany. To simulate boat covers on the small lifeboats, the shape of the covers was carved along with the boats themselves. Blue paint was applied to that area.

Next, I pressed the fine cotton cloth into the wet paint to create the texture of the fabric. The little boats were then glued to the narrow slings cut from the same cotton cloth. Blocks and tackles held the launches in place.

With the boats in place, the radio antenna could be set up between the three masts. The antenna is run through a short span that slips over the top of the topmast head. The outer ends were drilled to receive the copper magnet wire which was pulled tight and epoxied into place, thereby bringing to a close the building of the model of the Research Vessel VEMA.

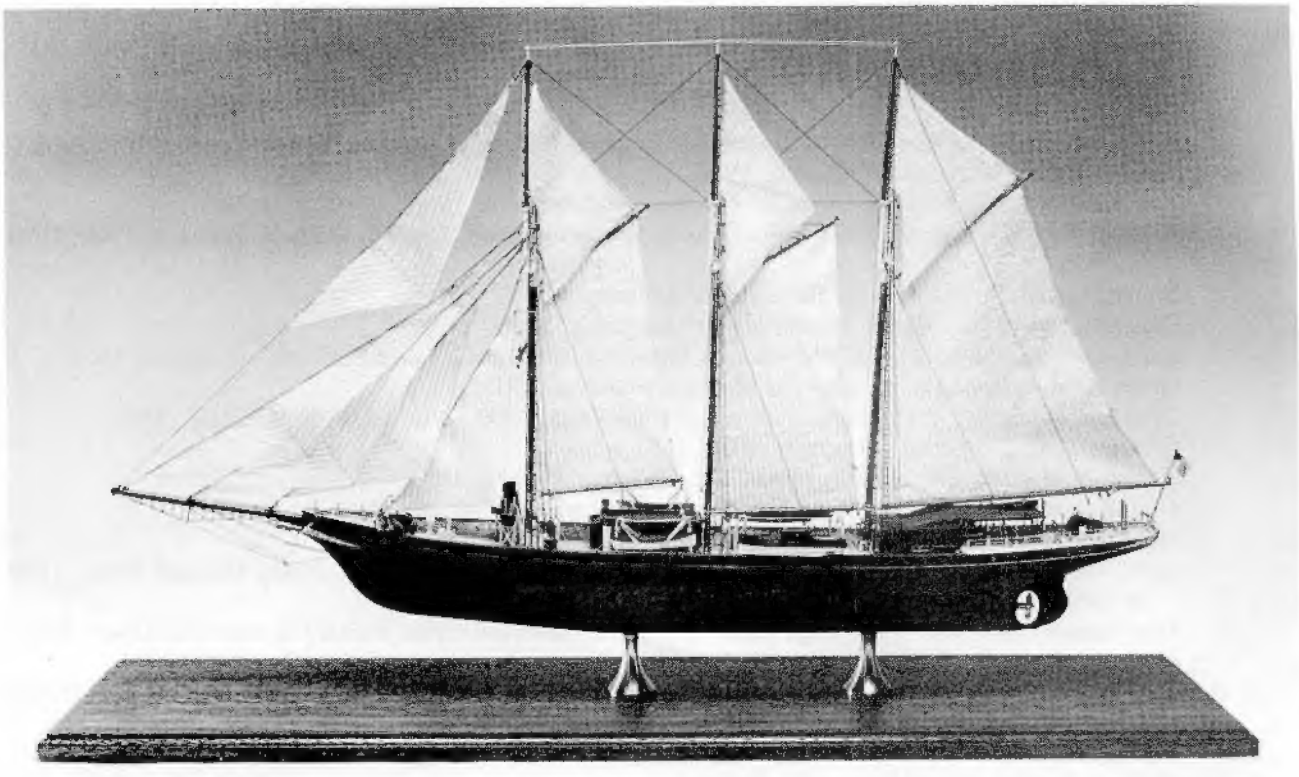


Photo 15. The completed model of the VEMA.
Photo by George Ancona.

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SHIP MODELING TECHNIQUES

By Portia Takakjian

This book covers the construction of the three ship models: The Royal Yacht FUBBS as re-built in 1774, the Hudson River Sloop VICTORINE of 1849 and the research vessel VEMA (1922) as fitted out in 1953. The author shares with you all the modeling techniques necessary to build these sailing vessels as well as tips for many ship modeling projects.

The Royal Yacht Fubbs

Because the Baroque style touched every facet of 17th century life, it is not surprising that yachts of that period would be as lavishly decorated as the larger ships. During the reign of King Charles II, there were over 23 yachts built. Of all these, FUBBS was the most outstanding. This model provides a true showpiece when finished.

The Hudson River Sloop Victorine

It is believed that the classic Hudson River sloops of the 19th century evolved from Dutch sloops. There are many regional types of vessels throughout the United States, but not all are known world wide. Fewer still are famous for their own sake. The VICTORINE was an exercise in research for the author that brings about a model of distinction.

The Research Vessel Vema, ex-Hussar

The VEMA was a schooner yacht, chartered for her first cruise in 1922. In the 1950's, she was fitted out as a research vessel for Columbia University. Her iron hull made this ship reminiscent of some of the large fishing schooners in the northeastern United States.

These three models represent over 200 years of sailing ships. Each model is unique and can be constructed from the step-by-step instructions given for each model. Photos and illustrations lead the reader through each model. Many of the author's techniques and practices are applicable to building any scratch model ship project.

This is Takakjian's third book (*32 Gun Frigate Essex, Building A Plank-On-Frame Model* and *Anatomy Of The Ship: The Frigate Essex 1799*).

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